

The College Library Building Its Planning and Equipment

By

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With a Foreword by

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PRESIDENT OF THE
CARNEGIE CORPORATION

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PREFACE

During the past few months it has been my good fortune to enjoy the hospitality of more than fifty representative American colleges and to have the opportunity to discuss with their officers the problems connected with the development of their libraries. Almost everywhere there is a clear conception of the increasing importance of the library as an element in the teaching process, and an eager desire to know how it can be administered so as to make its largest contribution.

A large number of colleges, the country over, are facing the necessity, in order to house and to provide for the efficient use of their rapidly growing collections, either to build anew or radically to remodel existing buildings. There has been hitherto no handbook of principles and standards by which they can be guided in the development of a plan. An attempt has been made in this book to formulate enough of the results of experience, some of it very costly, in a large number of institutions, so that they may be assisted in the interpretation of their own needs,

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present and future, and enabled to plan a building that will be at once effective and flexible.

That the standards which are recommended are higher, in several particulars, than those that have been incorporated in a number of the recently planned buildings, I am perfectly well aware. It is my hope nevertheless that their validity has been demonstrated. All of them have had careful study and they represent what I believe to be minimum requirements for a building that will permit the library within to have its highest usefulness.

To the Carnegie Corporation, to whose initiative and generosity the book owes its origin, to Dean Arthur M. Greene, Jr., and to Angus S. Macdonald, for their assistance and advice regarding engineering details, the writer wishes to express his grateful appreciation. J. T. G.

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FOREWORD

In the "advancement and diffusion of knowledge and understanding"—to borrow the fine phrase which sets forth the purpose of the Carnegie Corporation—the college library occupies a position of great strategic importance. Faculty and students represent, even separately, highly selected groups; when the two really work together, and that this is possible is being demonstrated in an increasing number of colleges today, the united group thus formed is of unique significance. First-rate library service is absolutely necessary to success in their enterprise, and such service demands not only a generous array of books and journals, well selected and up-to-date, not only a professional staff intelligent and quick to see their educational opportunities; it demands as well a physical equipment which meets the needs of the situation.

Money alone cannot provide such equipment, as we have all too abundant evidence to prove. Wisdom is needed as well, a form of wisdom not easy to acquire, for it does not grow from the experience of the librarian alone, or of the faculty,

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or of the architect. It must come from the joint labors of all three, but based upon a broad knowledge of what has been already attempted and achieved.

Mr. Gerould gives us in this little book the fruits of an unusual experience in the administration, planning, construction, and equipment of academic libraries; and the Carnegie Corporation counts itself fortunate in having had a share in making possible its preparation and publication.

F. P. KEPPEL.

CHAPTER ONE

THE EDUCATIONAL IMPORTANCE OF THE LIBRARY AND ITS BUILDING

In June of every year thousands of young men and women emerge from our colleges bearing a diploma which certifies that they have completed a certain number of courses and complied with a variety of rules. How many of them are really educated? In school and college they have spent fifteen or sixteen years. They have studied English and German, Latin and French; they have had courses in history and economics, physics and chemistry, mathematics and philosophy,—a half dozen other subjects perhaps. They have had hour tests, term examinations, and it may be comprehensives. At each stage since they entered the elementary school, they have been coached to meet the entrance conditions of the next; and the process culminates and ends when the degree is granted. In too many cases the undigested and unassimilated facts, with which they have been crammed, have been disgorged on the examination paper; and, a few months later, they show no signs of any effect, ill or otherwise, of this sys-

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tem of forced feeding. Not all of them are immune, but too many are the victims of this attempt to apply mass method to education.

"American education is of two types," remarked the president of one of our great state universities a few years ago, "the quantitative and the qualitative. For better or for worse, it is the function of the state university to provide the quantitative." There is no doubt that, hampered as they are by floods of the incompetent, they are doing an exceedingly good job. The vagaries against which Dr. Flexner has so successfully directed his wit and satire, the blatancy of some of their "get education quick" methods, are characteristic, as every one at all intimately acquainted with their work very well knows, of only a fraction of the courses given and the methods employed.

By far the large majority of the men and women, who make up the faculties of the state universities, are no less well trained, no less inspired by high ideals of scholarship, no less hard working and clear thinking, than are their colleagues in private institutions. They are striving heroically to convey to the heterogeneous mass of students, many of whom have no proper place in a university, some sense of the essential values of

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life, and some training that will fit them for their place in society. The task is exceedingly difficult. In a class of fifty students, there can be little attention to the individual, little opportunity to discover latent capacities, and to apply the proper stimuli for their development. For the student, opportunities for self expression are few; and for the teacher, there is a constant temptation to allow his work to become mechanical. Despite the "investigations" which purport to show that teaching in large classes is as effective as that in small, teaching is, and will remain, something that passes from one teacher to one student. As a method of manufacturing and accumulating "credits," mass methods are a complete and unqualified success; as education they are an abject failure. There are, fortunately, intellects so keen, minds so full of curiosity and so avid for its satisfaction, that they can wrest an education from the cogs of the machine, and will not permit themselves to be crushed between its rollers. There are teachers who have the power to make the contacts, here and there among the mass, through which the divine fire is transmitted.

The rumblings of this educational machine are not confined to the state universities. Dr. Flex-

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ner selected his targets largely from institutions on a private foundation. There are plenty of them, east and west, north and south, which have all the faults of the state universities, and to these they add some of their own.

It is a realization of the inherent weakness of mass production in education that has been responsible for the renaissance and the developments, during the last generation, of the liberal arts college, always the most characteristic feature of American education. These institutions are of all types and varieties. Some of them, Oberlin, Princeton and Dartmouth, for example, are, by former standards, large institutions. Within limits, size is secondary. The essential is an ideal, a president who has vision and courage, a faculty that, in training, personality and number, is competent for the task, adequate libraries and laboratories, and buildings and surroundings that are humanizing.

The Association of American Colleges has a membership of 437. Half of these institutions enroll less than 500 students, 23 per cent of them less than 300. Through lack of adequate support, some of these colleges are unable to maintain a standard as high as they would wish, but for all that their contribution to the education of the

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country is of high value. In many regions, they are the only means by which young men and women are able to secure anything approximating to a higher education and an escape from their environment.

In many of the colleges, the development, in recent years, has been phenomenal. Endowments have been increased; new buildings have been built; faculties have been strengthened; courses of study have been liberalized and improved; methods of instruction have been revolutionized.

Except as it provides a skeleton which the student may clothe with the living flesh of his own creation, an outline for criticism and emendment, in the more progressive institutions, the text book has largely passed out of use. Even in his Freshman year, the student is expected to gain some conception of the relativity of truth, to compare the views of one authority with those of another; and to build in his own mind a structure of substance and coherence. At first, this is a painful process. Hitherto he has been taught to learn; now he is asked to think. It is disturbing to find that an "authority" is not infallible, and that his theory of the continuity of events and the interaction of forces is not necessarily final. To his amazement he discovers that even axioms, such

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as that two and two make four, can be accepted only after rigid definition. His foundations are shaken. He learns that many æsthetic and ethical principles, which he has accepted without question, are no more than formulæ to express the consensus of opinion of the generation that is passing; and that they are in a constant state of flux. Everything seems disorderly and capricious. Slowly, painfully, he begins to reconstruct his cosmos, not as something resting on tradition and authority, but as having validity within his own mind as a working hypothesis of life.

During all of this time, the teacher is by his side, suggesting, questioning, stimulating,—a friend, a fellow student just a little further advanced along the road, who is able to warn him of its pitfalls, to advise him of pleasant excursions away from the beaten track, to aid him to find the meanings of things he does not understand, and to combine them all in an ordered whole.

The best teacher in the best college in the world cannot give a student an education. He can lead the way to the mine from which it can be dug, provide him with the proper tools, and show him how to use them. He can encourage him when disheartened, and spur him to more vig-

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orous effort, but the student will own only so much of the precious metal as he digs for himself.

The library is a necessary part of the process, for it is both the mine and the box of tools by which it is worked. On its richness and variety, on the convenience, attractiveness and accessibility of its housing, depends, in no inconsiderable degree, the success of the student in securing an education. More and more clearly every year, educational administrators and boards of trustees are realizing its importance, and are struggling to increase the sum available for the purchase of books, and to provide an adequate building for their use.

There is no disputing the fact that a very large proportion of the colleges of the country have neither libraries nor library buildings adequate for their purpose. Some have fairly good collections of books installed in buildings so cramped and inconvenient that proper use of them is impossible. These buildings, erected a generation ago, —though some of the worst of them are of more recent date,—are badly planned and completely incapable of adaptation to meet present needs.

It is only in very recent years that educational administrators and architects seem to have sensed the fact that the college library is not

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static, that its growth and regeneration must be continuous if it is to live. There has been a delusion, and it still persists, that a certain number of volumes, 20,000, 30,000, perhaps 50,000, are all that are needed for undergraduate use. If these were housed in a building in which there is a reading room, seating a score or two of students, and an office for the librarian, measuring eight by ten feet, no more was required.

It is not surprising that the buildings erected under the influence of these ideas were badly planned. Even when wisdom has prevailed, the sum available for the building was scanty. Frequently the architect and donor were more interested in erecting a monument than a working building. The college has taken what it could get. The result has been that within a few years, if not at the beginning, the structure was outgrown, and constricting to the work of the institution. The terms of the gift may have been such that the building could be used only for library purposes. In any event, its presence on the campus makes it very difficult to secure funds for a new and more adequate structure.

There is a serious doubt as to the right of a board of trustees to accept the gift of a building, the planning of which they cannot control; or to

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permit the erection of a structure which is hampering to the best interests of the institution. At one of the best colleges on the Pacific Coast, a library building has recently been erected which completely illustrates the point. The donor selected his own architect and, disregarding all advice from within the institution, adopted a plan and constructed a building that causes the judicious to weep. It is wrong in almost every particular, and effectively blocks the efforts of the librarian to give satisfactory service. The building is a liability, rather than an asset; and the interests of every professor and student in the institution are injured by it.

No one can tell what the library of fifty years hence will be like; but there is every reason to believe that it will play a role increasingly important in the educational process. Tendencies are fairly well established, and must be given full consideration in present planning. There is general agreement as to the functions of the library of to-day and the type of building best adapted to permit it to exercise them. It is with an attempt to formulate the principles which underlie these functions, and to translate them into the programme for a building, that this book is written.

CHAPTER TWO

THE SITE

Except in the occasional instance of the college, newly established on a large endowment and able to plan and construct a complete plant, most institutions have developed about a single building, an Old Main or something of the sort, simple in design, and unless it was planned in those dreadful decades following the Civil War, generally dignified and beautiful. About it came to be grouped sometimes symmetrically, but more often in haphazard fashion, the dormitories, recitation buildings, laboratories, the library, the auditorium, etc. It has been only within the last generation that it seems to have occurred to anyone that it would be a good idea to follow the example so magnificently set by Thomas Jefferson at the University of Virginia, over a century ago, and to develop an ordered plan for future construction. There are now, all over the country, a good many institutions which have employed competent architects and, after a careful consideration of their probable future, have determined, in greater or less detail, the location of future buildings and the landscaping about them.

SITE

Excellent examples of plans of this sort are those at Carleton College in Minnesota and Rollins in Florida. In both of these the future library building occupies a dominant position as the central feature of the group. In others, it is the auditorium, an administration building, or a chapel.

While it would be unfair to conclude that the choice of any one of these over the other is expressive of the major interest of the administration, the fact that the library is so often selected for the position of honor indicates a clear conception of its importance. In certain conditions such a location may be unfortunate. If the monumental position does not satisfy the conditions which are outlined below, or most of them, it should not be chosen. There is a very great temptation too, in a building so placed, to allow architectural considerations to outrun those of convenient use and future expansion. Frequently, it is felt that the dignity of the administration requires that its offices should be located in the building; and when once they are so placed, it is difficult to dislodge them. The cost of a building on such a commanding site will necessarily be greater than if it is located in a less conspicuous position, and this may possibly delay the construction longer than would otherwise be the case; but it is equal-

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ly possible that, because the site permits an ornate treatment, it may be attractive to some donor wishing to establish a memorial.

There are two conditions which are absolutely essential to a satisfactory site. It must be of sufficient size to provide space for a building, planned not only to suit the needs of the present but capable of extension to meet such conditions as may develop in future generations; and it must be readily accessible from recitation halls, laboratories and dormitories.

So long as there is ample room for expansion in the rear, the frontage can be limited, but in this dimension it is not wise to go below 200 feet. Even though the building, as originally planned, may have a frontage of only half that amount, the additional space is necessary to give the building its setting, and to permit freedom in its future development.

The second consideration is the relation of the site to those of other buildings. Ideally, it should be close to the geographical centre of the campus; but it is seldom that a central location can be found that, for one reason or another, is not constricted. In the campuses of coeducational colleges, it is customary to plan for the construction of groups of dormitories for men and wo-

SITE

men, radiating in separate directions from the recitation buildings and laboratories. It is with the latter group, rather than with the dormitories, that the library should be associated, though the distance that separates it from them should be kept as short as possible. The library is the focal point of the institution and the aggregate of time lost, even if the building is only a few minutes distant from the natural centre, is extensive. The interval between classes is short, and a convenient location will make it possible during it, to return a book or look up a reference. The business of a cigar store, or a grocery, may depend on whether it is on one side of a street or the other; and, in locating them, careful studies are made of the passing traffic. The college should take a leaf from the book of trade. It is all very well to argue that the student should not allow a few hundred feet of distance to make any difference in his work. The fact remains that we humans are a lazy lot; and we clutch on any sort of excuse to justify our derelictions.

The site should, in most climates, face north or east rather than west or south. In most library plans, the large reading room is at the front; and if the building faces the south, the curtaining of large windows, to cut off the direct rays of the

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sun, is difficult. In the summer months, both the heat and the excessive light are intolerable. Curiously enough, however, it is in some of the southern states that a location facing south is almost necessary, as from that direction come the summer breezes essential to comfort.

The planning of the building will be easier, too, if the site is lower in the rear than in the front, as it enables a more convenient disposition of the freight entrance and the construction of one or more book stack levels open to the air at one end, sometimes on three sides, below the main floor of the building. This is of importance in that it increases the amount of shelving easily accessible from the circulation desk, the total stack capacity below the level of the roof, and the number of carrels available for student use.

When once the site has been established, under no consideration should later buildings be allowed to encroach upon it. It must be kept free for future development. One of the well-known New England colleges, with a building erected within twenty years, but which already needs enlargement, has completely blocked this expansion by the erection of a dormitory so close to the rear that no addition to the building is possible.

CHAPTER THREE

THE PROGRAMME AND THE PLAN

The reason that we have such a large number of unsatisfactory college library buildings in this country is that most of them have been planned and constructed with too little knowledge of the functioning of the library, too little imagination as to its growth, and too little study of practice in other institutions. Every one has used libraries, of course, and, in a general way, knows what the building must contain. There must be reading rooms, stack rooms, an office for the librarian, a few rooms miscalled "seminars," and possibly, if one is very modern, a browsing room; but the dimension of these rooms, and their relation each to the other, is seldom given proper study. A few notes, together with the limit of cost, are turned over to the architect; and he is expected to produce a proper building. Generally he is even less advised as to the business of the library than is his client. He turns over the pages of his journals, studies the design of such buildings as he may come across, perhaps visits a few that are in the vicinity,—most of which are probably the result of the same type of planning,—

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draws his own sketches, and they are accepted. The result is that, even in many buildings recently planned, the demonstrated mistakes of a generation ago are being reproduced. During the decade from 1900 to 1910, thanks to the generosity of Mr. Carnegie, scores of library buildings were erected the country over. These buildings tended to conform to a certain type; and, as one goes about, they can be spotted almost unvaryingly. Typically, the entrance opens on a central rotunda, lighted from above by a skylight. In this room are the circulation desk and the public catalogue. On either side, frequently without any separating partitions, are small reading rooms, while behind is the book stack. On the second floor, surrounding the light well, are a number of seminar rooms or offices. In the basement are a few more rooms, frequently badly lighted and ventilated, toilets and a store room. If 100 square feet were allowed for office space, that was generous. These buildings, however they may have suited their purpose in their day, and they were never very adequate, are totally incompetent to meet the demands of the present; and generally incapable of adaptation to suit the increase in the number of books, of students and of use.

There is not, and should not be, any standard

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plan. Each institution has its own individuality and its own needs, and the building should be so planned as to express them. The problem of a coeducational institution is somewhat different from that of one for men or women alone; the institution in an urban community, where there may be access to other large libraries, needs a different programme from the college in a rural situation, where little outside aid can be expected. Climatic conditions should be taken into account and capitalized.

There is general agreement that no library building in the country, large or small, is better adapted to its task,—certainly none is more flexible in design,—than that at Dartmouth College. For a generation, the college had recognized the complete inadequacy of its old building, erected in the '80's to serve a college of three hundred students; but which was compelled to endeavor to satisfy the demands of a student body of two thousand. Very wisely the college determined to do nothing until it was ready to seek a complete solution of its problem. Makeshifts of various sorts became necessary. Sections of the library, and reading rooms for their use, were placed in other buildings. As opportunity offered, books were purchased, even though it was necessary to

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place them in storage. From 1915 to 1925 a faculty committee, at the request of the board of trustees, made a careful study of the problem.

Month after month this committee studied the various factors involved, the accelerating growth of the collection and its probable size in future years, the problem incident to the new method of study and teaching, the types of reading room required and their number, the provision of proper facilities for advanced study, the space to be provided for administrative services, and for accessories, such as coat rooms, toilets, a bindery, a photostat room and the like. Information as to practice in other institutions was sought by correspondence and by personal visits by members of the committee. In 1925, the committee presented its report, a document of twenty-two typewritten pages, going into great detail both as to the facilities required and as to their reasons for recommending them. The report was adopted by the faculty and by the board of trustees. No money was in sight, but the trustees authorized their architect, Mr. Larson, to prepare a plan. When the sketches were approved and the plan developed, a tentative estimate was made of the cost. The figure was large, but before many months had gone, President Hopkins was able to

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announce a gift by the late George F. Baker which assured the construction of the building. The sum which was provided was slightly less than the estimate on the building as planned; but, without materially reducing its effectiveness, changes in the plans brought the estimated cost of the building within the sum which had been given.

This process has been described in some detail both because it is unusual and because it furnishes a model for other institutions facing a similar problem. Dartmouth is definitely committed to the policy of remaining a liberal arts college, with a student body limited to two thousand men; but the problem is in no way different for the smaller or for the larger institution. Within the knowledge of the writer, several other colleges are shaping the plan for a future building by a similar method; and it cannot be too strongly recommended.

It may be objected that to entrust the formulation of a programme to a faculty committee, without imposing on them a limit of cost, may result in a plan both too extensive and too expensive for realization. It must be presumed, however, that the committee will be composed of men and women of intelligence, who will not be unreason-

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able in their demands. It is undoubtedly true that a carefully worked out and ordered plan, based on detailed studies of the purposes of the building and supported by an adequate argument, will appeal to prospective givers who would be left quite cold by a request for a building costing a smaller sum presented in general terms. To many men, the larger project will be more attractive than one conceived on modest lines. The part played by the library in the educational life of the college is steadily increasing in importance; and unless an institution is ready to attack the problem of adequate provision for its library, it is far better to postpone its construction, than to erect an inadequate structure that will later on stand in the way of a more satisfactory solution of the problem.

This is not to be interpreted as to mean that all of the building as planned need be erected at once. Modern methods of construction make it perfectly easy to build on a unit plan, using temporary walls and partitions. The ultimate cost will, of course, be slightly greater, and something of initial artistic effect may be sacrificed. Architects, frequently donors, do not like to do this; but a college is, after all, an educational institution rather than an exhibit of architecture.

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The problem is one that calls for ingenuity and skill on the part of the architect, so that at every stage of development, the building will appear as a completed structure.

There is no incompatibility between beauty and proper functioning. The best of the architects of to-day recognize this perfectly, and prepare their plans only after a careful study of the types of work for which the building is to provide a place, and the areas necessary to give it proper housing. His task then becomes that of giving the rooms grace and proportion, and of providing an exterior that is harmonious and beautiful.

Even though the building to be erected is thought of as a complete structure, it should be so planned that, should conditions change, additions can be made to it. The architect's drawings should show precisely what are the possibilities for future expansion.

One of the most important questions which the committee must determine is the vexing problem of centralization. Shall the books in the sciences be shelved in the laboratory building, the books on the fine arts in the building where those courses are given, and so on? The arguments in favor of such an arrangement are fairly obvious. The laboratory teacher, during the conduct of his

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courses, wishes to consult the authorities on some point about which he is uncertain, or he may desire to send one of his students to search for information in some reference book. It will be more convenient if the books are close at hand; and the time of the teacher will be conserved. There is no doubt that there is substance in this argument; and in a good many, although a decreasing number of, institutions this policy is maintained. Most often it is the books in physics, chemistry, geology and astronomy that are thus segregated; though there seems to be a tendency to isolate the collection of books on the fine arts recently given to a good many colleges by the Carnegie Corporation.

In opposition to this view, it is argued that the college exists for the purpose of giving the student an education,—which is something very much more than a certain amount of information about the various subjects in the curriculum. It is unitary, a reconditioning of the mind, rather than a summation of facts and principles. In so far as we attempt to departmentalize knowledge, to segregate it, we defeat our real purpose.

It is true, moreover, and to a continually increasing extent, that the lines which divide subjects are breaking down. Where does biology

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stop and chemistry begin? What is the boundary between chemistry and physics, and how can you disassociate any one of them from mathematics? The teacher of literature must constantly resort to books on history, or economics or the fine arts. Psychology has been divorced from philosophy; but *en seconde nocce* it has married education, and maintains a left-handed relationship to biology and physics. There is something very vital that is lost if these relationships are in any way broken.

Then, too, books in a departmental collection tend to be looked upon as the private property of the department. Sometimes this is baldly expressed, and outside use is not welcomed; but even if this is not the case, and there is actual hospitality, the fact remains that even the teachers in other departments, still more the students, hesitate before resorting to the books. As there is seldom a paid custodian, whose business it is to supervise the books, a key must be found; or some one, busy about other things, must be withdrawn from his work to give the reader access to the books.

In many places these departmental collections are shelved in a locked room to which the members of the department, sometimes a few stu-

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dents, have keys. Human nature being what it is, almost invariably the books become dispersed, if not lost altogether, through the carelessness of the people who have access to them.

Only in the case of the largest institutions, is it possible to employ a trained assistant to care for the books. Generally they are put in the nominal charge of a stenographer, or some clerical assistant, who knows nothing about them, and frequently resents this addition to her duties. At the worst, they are shelved in the office of one of the professors, convenient for him, to be sure,—a sort of private library,—but quite inaccessible to those outside. There are plenty of cases where, because of the personality of the professor, or some intradepartmental jealousy, they are of almost no use to other members of the staff.

Even in the case where a trained assistant or a departmental clerk is in charge, the room is open, at most, for eight hours in the day, rather than for the fourteen hour period that most libraries have as their schedule. Laboratory buildings usually are closed at 5 or 6 P.M., the library at 10 P.M., or even later. On Saturday afternoons and the minor holidays, when the general library is open, these books are inaccessible.

Again and again every librarian has been told

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by members of the departments having collections of this sort, that the books in them are of no interest or use to any one outside. He may be courteous and not deny it; but he knows very well that the familiar delusion has little basis in fact. For some of the reasons cited, they may not frequently be used; but if reference to them is not desired, it argues a certain narrowness and lack of proper intellectual curiosity on the part of the staff of the other allied departments.

Certain books there are, obviously, that should in any case be kept in the laboratory—hand-books, books of tables and constants, dictionaries and the like (some one has styled them as “cook-books”), but these should generally be duplicate copies, not necessarily a part of the library at all.

Segregated collections almost inevitably lead to undue duplication of expensive books. There are many important works, the subject matter of which cuts across rigid departmental lines, and they are as properly placed in one collection as in another. It is illogical, because the professor of chemistry has asked to have a copy ordered a week before the professor of physics files his request, that the latter should not have free access to it, and a second copy is bought. Not infrequently files of periodicals must be duplicated.

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Every purchase of this sort makes impossible the addition of some other book of equal importance.

Another added expense incident to the departmental collection is the necessity for the provision of a duplicate catalog, a not inconsiderable item and a continuing charge on the budget.

When all of the above has been said, however, it must be recognized that traditions, which have developed into a sort of vested right, the distance separating the laboratory from the library building, local conditions of other sorts, make it expedient, in certain cases, even in a small library to maintain some of these outside collections. The argument of the chemists for immediate access to their books seems stronger than that of the other scientific departments.

Any satisfactory plan for a library building must be adequate in four particulars,—in its provision of sufficient space for undergraduate study, for study of a more advanced type either by graduate students or members of the faculty, for the administrative work of the library staff, and for the shelving and storage of books. In addition, and this cannot be stated too strongly, the plan must be sufficiently elastic so as to provide for the possibility of future enlargement in all of these four major services. If a building satisfies

FUNDAMENTALS OF PLAN

these conditions, it is successfully planned. In the measure that it fails to do so, it will hamper the proper development, not only of the library which it houses, but of the college which it serves.

No architect can be expected to determine what are the basic facts which define adequacy of these four types, nor can he prepare a satisfactory plan unless this data has been furnished to him by the administration. Nor can these figures be estimated by the officials of the college without a careful study, each as a separate problem, of the necessities of the students, the faculty, the staff, and for book storage. Some colleges have set a definite limit to the number of students that they will accommodate, and others have not. For the first, the determination of the volume of facilities for student use is simplified. This must be remembered, however: The building being planned is not for this generation alone but for the next, and that following. Who can say that the board of trustees, the president and the faculty of twenty years hence will adhere to the limits set by those now in control? While obviously the provision initially made should be for a student body of the determined size, there should be an anchor to windward in the possibilities for expansion.

THE COLLEGE LIBRARY BUILDING

How many, how large a proportion, of the students in the college should be given accommodations in the building at any one time? In the decision of this question, there are a number of factors involved. Do the students live in dormitories close by, or do many of them reside at a distance or in their homes? Does the college, as a matter of educational policy, desire to encourage study within the building or outside?

In most places the dormitory is increasingly an unsatisfactory place for serious and uninterrupted work, and most homes are not much better. There is a radio next door, or a victrola, or a candidate for the orchestra. Friends are constantly dropping in for conversation, or a game of cards, or with an invitation to go out and eat a hot dog. One must be hospitable. At home Henry is needed as a chauffeur, or mother wishes him to see if he can fix the vacuum cleaner, or to discuss the contents of a letter just received from brother Bill, who is in prep school. Friends call and must be entertained. In the library he is free from all that. There are distractions there, of course, but for these the responsibility cannot be shifted to some one else.

In the library too the reference books are at hand; and when, as he reads, his interest is

ACCOMMODATION FOR STUDENTS

aroused by an unfamiliar fact or name, when he lights on some allusion that he does not understand, his curiosity can be satisfied rather than postponed until he has forgotten all about it. If he finishes one assignment earlier than he expected, there is always another at hand. The material for it quite likely may not be in his room. With the diversity of interests that make up the life of the boy or girl in college, the conservation of time is an important matter; and the likelihood of its proper employment is greater within the library than outside.

In the days of the older curriculum and methods of teaching, a provision of reading room accommodations for 10 per cent of the student body was considered ample, and as a matter of fact frequently was more than was used. That time has passed. Thirty per cent is now almost a minimum. Several recent buildings are planned so as to provide accommodation of one type or another for 50 per cent of the student body. The fact that at present no such proportion of the students use the library of the institution, for which the building is being planned, is no criterion whatever as to the amount of use of a more adequate structure. That the building will create new business has been demonstrated again and

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again. If the rooms are well lighted and ventilated, if the seats are comfortable, and if the rules governing them are reasonably human—sometimes they are not—the space will, during certain hours of the day, be fully occupied.

It is as important that adequate provision should be made for the faculty as for the students. If they are to remain intellectually alive, they must not “repose on aught found made,” but must continually refresh themselves by excursions farther and farther afield in their chosen domain. There is a good deal of nonsense abroad on the subject of teaching versus research, and an assumption that the two are incompatible. There are, of course, competent research students who cannot teach; and, much more rarely, there are men who are valuable inspirational teachers who lack the scholar’s curiosity and ability in its satisfaction. Such cases are, however, exceptional. Generally it is true that the best teachers are those who are not content to draw continually on their reservoirs of knowledge accumulated in the past, but who labor continually to keep them full. The college has a very definite obligation to provide for its teachers sufficient leisure to permit this, along with library facilities, in books and proper places to use them.

ACCOMMODATION FOR BOOKS

Without these conditions, they cannot be expected to keep abreast of the developing knowledge within their field, and make their own contributions to it. What these provisions are will be discussed later, but they must be kept in mind in any consideration of the adequacy of the plan.

For how large a number of books should the building be planned? Professor C. N. Haskins, who has studied the rate of growth of the libraries of a group of colleges, has shown that the average rate of annual increase (corresponding to a rate of compound interest), for the libraries in question, has been

<i>Institutions</i>	<i>Years</i>	<i>Annual Increase Per Cent</i>
Amherst	1833-1925	3.91
Brown	1824-1914	4.06
Dartmouth . .	1829-1925	3.00
Harvard	1802-1925	4.54
Michigan . . .	1846-1925	6.58
Princeton . . .	1838-1924	5.08
Williams	1875-1925	3.82

He concludes that "the geometric law of increase is a reasonable basis for the prediction of the growth of American college and university libraries over periods of from fifty to one hundred years."

The table which follows will illustrate, in actual figures, the growth of college libraries of various types. The figures for 1876 and 1908 are

THE COLLEGE LIBRARY BUILDING

those of the United States Bureau of Education
and those for 1930 are from the American
Library Directory.

	1876	1908	1930
Amherst	30,406	90,000	162,078
Bates	4,500	27,875	57,375
Beloit	8,300	40,000	78,000
Bowdoin	18,760	91,546	146,000
Brown	45,000	150,000	390,781
Bryn Mawr		54,996	124,024
Carleton	2,575	20,950	92,000
Colorado		45,000	90,000
Cornell (Ia.)	4,000	29,868	60,202
Dartmouth	20,000	100,000	300,000
Drury	2,000	29,806	46,926
Franklin & Marshall ...	3,500	29,000	53,000
Grinnell	4,500	39,378	81,555
Hamilton	17,000	47,907	134,000
Haverford	7,000	50,000	115,000
Kalamazoo	2,600	12,000	26,050
Knox	5,000	9,000	35,000
Lafayette	16,000	30,000	74,420
Lake Forest	1,000	21,875	39,994
Lawrence	7,000	24,616	52,625
Mills		8,730	52,000
Mt. Holyoke		38,000	111,000
Notre Dame	10,000	70,000	137,000
Oberlin	7,000	100,293	311,500
Pomona		10,000	60,240
Princeton	29,500	260,000	640,000
Smith		27,110	165,000
Swarthmore	2,000	33,500	70,000
Trinity	15,000	56,536	100,000
Tufts		58,866	96,000
Vassar	9,632	62,000	163,529
Wellesley		63,011	131,059
Wesleyan	26,000	79,000	165,000
Williams	17,500	72,500	129,639
Total	315,773	1,877,363	4,490,997
Average	12,145	55,216	132,069

ACCOMMODATION FOR BOOKS

It will be noted that from 1876 to 1908, a period of thirty-two years, the libraries represented in the table rather more than quadrupled in size; and that in 1930 they were more than twice their size in 1908. The records of a number of college libraries show that they double in size in about twenty years. There is no reason to doubt that this rate will continue.

From every point of view, it is advisable, consequently, to plan the stack room so that it may contain shelving for double the number which, *when the building is opened*, will be in the library. On this point, a word of caution is necessary. If the books in the present building are badly crowded, more than double the running feet of shelving will be needed. Twenty-five to 30 per cent more should be added to provide convenient location for the books then in the library, and the total should be doubled to provide for the future. The probability is very great that, within twenty years, still further additions to the stack room will be necessary.

The proper control of the building, with a minimum staff, should constantly be kept in mind. On Sundays, holidays, and during the late evening hours, the library must operate with a smaller number of attendants, and that they may

THE COLLEGE LIBRARY BUILDING

exercise necessary supervision, careful planning is essential. The number of public exterior entrances should be the minimum, and those of the reading room and the stack should be in plain sight of the assistants at the circulation desk.

The degree of necessary supervision depends largely on local conditions. Presumably it is greater in coeducational institutions than where the sexes are separated; in a city, where the library is used by readers outside the college circle, than in a small town. Primarily it depends on the *esprit* within the institution itself, on the degree of self control that the students have learned how to exercise. Among our colleges generally, it is perfectly safe to say that much less supervision is necessary than a generation ago.

Hardly anything is more fundamental to successful library planning than the establishment of uniform floor levels. There will not be a room in the building into which it will not be necessary to move books on a book truck and it is imperative that the levels should be adjusted so that it is possible to do so. Every floor should be coincident with one or another of the stack decks. If these decks are spaced 7' 6" apart, this establishes the ceiling heights, except for the reading rooms and those on the top floor, at 15'. For

FLOOR LEVELS

small rooms this seems wastefully high, but it cannot be avoided except by making the main floors coincident at every third stack deck and introducing an intermediate floor which for book transportation is reached by a ramp or an elevator station. In such a case the ceiling heights (less the floor thickness) would be 11' 3" or 13' and 9' 6". Such an arrangement is satisfactory if the intermediate floor can be reached by an elevator, but is a devilish device if a ramp is required. A truck full of books is very heavy and it can be moved up and down such an incline only by an able-bodied man, and even then the motive power must be supplemented by a large expenditure of profanity. It is much wiser to accept the higher ceiling. If it proves to be necessary, for motives of economy, to have them, ramps should have a rise of no more than 1' in 9'.

For similar reasons door saddles, or thresholds, should never be used.

CHAPTER FOUR

READING ROOMS, SEMINAR ROOMS, ROOMS FOR INDIVIDUAL STUDY, BROWSING ROOMS

READING ROOMS

There is no consensus of opinion as to the type and character of reading rooms. In favor of concentration, it is argued that a large monumental room gives dignity and character to the building, that it is more flexible in use and less expensive to supervise. In opposition, it is argued that the requirements of the students who wish to use the books reserved for required reading, the general reference books and those from the stack, the periodicals and newspapers, differ so widely that the three types of service should be provided in different rooms. Unquestionably there is force to this contention. It is argued too that rooms relatively small have less of an institutional atmosphere; that in them there is likely to be less noise and confusion. This last point has, I think, been overstressed. As a matter of fact, the larger the room, if it is properly planned and constructed, the less is the disturbance caused by the coming and going of readers and by whispered

READING ROOMS

conversations. Noises seem somehow to disappear. The great reading room of the New York Public Library, which provides seats for more readers than any other in the country, always has an atmosphere of quietude, if not of repose. Architectural considerations, and those of economy in administration, will probably continue to determine the planning and erection of large reading rooms in which all of the services are united; but it is unquestionably true that the trend of opinion and the practice in many recent buildings is in the other direction. A decision as to the two principles should be made only after a careful consideration of the different sorts of use for which the provision must be made.

(a) *General.* This room provides a place for the work of the students who are using their own books, supplemented by occasional consultation of the works of reference on open shelves in the room; of those who are searching for the answer to a specific question, or investigating a particular subject, which may or may not be related to class room work; of those who are reading books, drawn either from the stack or from the general reference collection, in preparation of class assignments, themes, debates, etc.; and finally of those who are doing cultural reading

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not related to any course which they may be pursuing. Work of the second type may involve the assembling and concurrent use of a number of books, periodicals and papers. For assistance in all of these types of use, the services of the reference librarian may be required, and her desk should be located either in the room or just outside. Shelving about the walls should provide amply for a carefully selected collection of reference books and there should be filing cases for more ephemeral reference material.

(b) *Reserved books.* During recent years it has become almost a uniform practice to remove from the regular shelves and to place on reserve the books in which reading is required in connection with current courses. In many cases duplicate copies of these books are supplied, in a ratio of about one copy for every ten students in the course. These books are sometimes shelved by courses about the walls of the reading room, but much more frequently are kept on special shelves behind a circulation desk. They are loaned for a short period, an hour, two hours, over night, sometimes for a day or two; and the record of these loans is customarily much more simple than that employed for the unreserved books. As the demand for these books is at a peak at the be-

READING ROOMS

ginning of each class hour, very rapid service is essential. Since the request for these books is made by author and title, rather than by call number, it is not necessary that the reading room where they are used should be immediately adjacent to the public catalogue. The desk where the books are charged may be within the room, but it is much better if it can be placed just outside. Except for a dictionary, and perhaps an atlas, it is not necessary that there should be any collection of general reference books in the room; nor need it be supplied by wall book cases, if provision is made for the shelving of the reserved books elsewhere. If, for architectural reasons, the general reading room and that for periodicals are placed on the second floor, this room may be located close to the entrance on the first floor.

(c) *Periodicals*. A room properly equipped for the use of periodicals must have about the walls shelving for most, if not all, of the sets, the volumes of which are indexed in Poole, the Readers Guide, International Index and similar publications; display cases for the current issues and pigeonholes, or other similar accommodations, for numbers no longer current but as yet unbound; a rack for the display of newspapers and a table for the convenient use of the indexes.

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Comfortable chairs are assumed, but it is not necessary that every reader should be seated at a table.

(*d*) Recreational reading is mentioned here but it will be discussed at length later on.

It is possible, of course, to combine all these services in a single room, and it is sometimes necessary to do so. If this is the case, it must be with a frank recognition that the resulting use is likely to be less satisfactory than that in rooms properly equipped for the several purposes.

Assuming that it is decided to plan for the four types of reading rooms, how should the space be allocated between them. There is no exact formula. The general reading room and the reserved book room should be approximately of the same size, though at present in many institutions the volume of reading is greater in the latter. As the amount of so-called independent reading increases, and it may be assumed that this is an ideal toward which every college is striving, the larger will be the demands on the general reading room. In the college library, where the number of periodicals is relatively small, the room assigned for their display and use may be smaller, possibly only half the size of the two others.

ALLOCATION OF SPACE

Assuming that the institution for which the building is to be built has a limit of 1,000 students and it is determined to provide a maximum seating capacity of 500, the distribution then might be 150 seats in each of the two larger rooms, 75 in the smaller with 125 to be accommodated in the browsing room, the seminar rooms and in carrels in the stacks. The size of the rooms may be determined by an allowance of twenty-five square feet of floor space for each reader. This figure covers aisles and space for the desks of the supervisors.

In some libraries the allowance per reader is reduced to twenty square feet, but this cannot be recommended. When this factor is used the room appears to be, and actually is, congested, the temptation to converse is greater, and concentration on one's work more difficult.

If the factor of twenty-five square feet is used the dimensions of the rooms will be

General reading room	3,750 square feet
Reserved book room	3,750 " "
Periodical room	1,875 " "
Total	9,375 " "

Two generations ago, in almost every library building, the reading room was broken up by alcoves, formed by the projection of book cases

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into the room at a right angle to the wall; and the type has persisted in some recent construction. Alcoves lend themselves readily to a charming architectural treatment; and they give to the reader a certain agreeable retirement. That they now are so seldom used is due to the fact that they involve an uneconomical use of floor space, fully 50 per cent more square feet being needed for each reader. Such rooms are more difficult to supervise, since the readers in the alcove are not visible from the desk. The projecting book cases are likely to interfere to some extent with the natural lighting of the central portion of the room.

In one of the reading rooms, arrangements may very well be made so that smoking may be permitted. With fireproof construction, with proper furnishing and ventilation, there is no reason whatever why a place should not be provided where men, women too for that matter, may be permitted to do so. Comforts of this sort, which tend to increase the amount of work done in the building, are to be encouraged.

SEMINAR ROOMS

Closely allied to the problems of those collections outside the building, already discussed, is

SEMINAR ROOMS

that of those rooms which are generally, and not very accurately, called seminars. The number and arrangement of these rooms involves very intimately large questions of educational and administrative policy. There is a very definite and increasingly evident tendency to introduce, into the upper class years of the curriculum, methods of independent study which are closely assimilated to those which have hitherto been considered as characteristic only of the graduate school. For students doing work of this character it is desirable that there should be provided a degree of retirement, and the ability to assemble and to retain, while a specific problem is being pursued, the books and papers essential to it. Both of these conditions are impossible in a large reading room. The larger the number of seminar rooms that are included in the plan, the more readily will the building adapt itself to the development of this type of work.

The permanent installation of collections of books in these rooms is highly undesirable, not only because of the fact that when the room is in use for seminar purposes, the books in it are unavailable for use by others; but because there is a tendency that students working with such a collection will place undue reliance on it and fail to

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make proper use of the more extended resources contained in the stacks.

Any selected collection of books represents the individual opinions and interests of one or more members of the department at the time it is made. However excellent may be their selection, however suitable to the courses given at the time, such a collection inevitably becomes out of date. There will be changes in the teaching staff of the department; the interests of the men in it will change; books which are standard to-day will be superseded by others. Even if the collection is kept up to date by continued additions, the books which have passed out of immediate use are seldom properly weeded out. It is far better that the permanent location of all but a very few handbooks should be in the stacks, and that a selection, suited to the courses actually in progress, should be temporarily placed in the seminar room.

A seminar room is not a small class room, and the tendency to use it as such should be resisted. Since methods of instruction vary so greatly, it is impossible accurately to define the types of work that may legitimately be conducted in such rooms. Obviously the classes must be small, their work must approximate the research type and

SPECIAL COLLECTIONS

such as to require frequent reference to the books shelved in the room. The size of these rooms will vary with the exigencies of the plan, but anything over 400 square feet is generally wasteful of space, and anything under 300 is apt to be too small. There should be at least one such room for each of the humanistic departments.

Another use to which such rooms may be put is the housing of special collections, given with the stipulation that they have undivided installation. Such collections, it may be remarked parenthetically, should be accepted with great caution. There are scores of them in colleges of this country which remain as a perpetual monument to the donor, but of very little use to the institution housing them. They fill space that should be used more productively; unless they are locked and inaccessible, they must have supervision that involves a continued charge on the budget; and unless they are endowed, so that additions can be made, they tend to become less and less useful. If the books are not, as a matter of fact, of the class called "rare," they should be incorporated with the main collection. If they are, they should go in the treasure room, or in a locked section of the stack. It is seldom that, on a frank and clear presentation of the facts, the donor will not permit this disposition of them.

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Throughout the entire area occupied by these rooms, the partitions should be of hollow tile and readily removable so that the space may be rearranged to meet a future need. In coeducational institutions, the upper part of the doors, and perhaps the partitions, may be of glass.

There is frequently a demand for the inclusion within the library building of offices and class rooms, and it is sometimes necessary to provide them. The necessity, if it exists, is to be regretted. The library is a place for study, and everything that is distracting should be avoided. Even though it may be understood that the introduction of such rooms is a temporary expedient, it is difficult so to plan them that, when later they are vacated, the space can satisfactorily be adapted to library use. The convenience of close association with the library, to the favored few so housed, is so great that it is exceedingly difficult to dislodge them when the time comes that the space is needed by the library. A vested right has been created, with which it is no more easy to cope because it is illogical. There is no reason, of course, why one department of instruction, or a few individuals, should be preferred above the others.

FACULTY STUDIES

ROOMS FOR INDIVIDUAL STUDY

While offices of the ordinary type, for members of the faculty, have no proper place in the library building, it is highly important that small rooms (8 feet by 8 feet is enough) should be provided for temporary assignment to members of the faculty who are, at the moment, engaged in some research or writing for which they require retirement and security from interruption. The day has passed when college teachers could have, in their own homes, a private library sufficient for their own research. Houses are too small, salaries are insufficient,—unless indeed the college desires to encourage celibacy. A considerable portion of any faculty are young men. During their most productive years they are rearing young children. If they are to develop intellectually, they must have a place in which they can escape from the noise and confusion which it is the inalienable right of childhood to produce. Rooms such as those suggested will pay rich returns in more efficient teaching.

At Dartmouth, where they have had their best development, there are fifty-one of them, all opening off corridors shut away from the rest of the building by a locked door, to which only those

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men to whom rooms are assigned have keys. One table, one chair, and a small book case, is all the furnishing permitted. None of the rooms have telephone connections.

In some buildings, a special reading room is provided for members of the faculty, but there seems to be little justification for it. Such a room is unsuited for work of the character for which the small rooms are designed, the faculty can be served more satisfactorily and with less expense in the general reference room; and in practice such rooms are little used.

BROWSING ROOMS

All of the rooms so far discussed are, of necessity, of a somewhat formal character, workshops above all else, places for study rather than for recreation. The task of the college is by no means accomplished when it has provided for the work of the student. The last generation has seen this fact fully recognized by the construction of "bigger and better" gymnasiums, stadiums, playing fields, and buildings for the housing of the student's "activities." Recreation is, however, as necessary to the intellect as to the body—a fact obvious enough, but until recently almost com-

BROWSING ROOM

pletely neglected by our colleges. No one can be said to be educated if, when the formal process is ended, it is not continued. A college graduate who confines his reading to the newspapers, *The Saturday Evening Post*, and an occasional detective novel, may have derived certain benefits from his course, but he cannot be said to be—to use a much abused word—a cultured man. He lacks that essential attribute, the habit of reading, a habit which, if not acquired in youth, is seldom gained later. It cannot be taught, for it is an affair of taste. It can be stimulated and encouraged, and it is the function of the college, and particularly of the college library, to provide every possible opportunity for its development.

There are teachers so stimulating, so vital, that their courses inspire the students under them to acquire this habit, but more often it comes through personal and informal contacts rather than through suggestions made in lectures or recitations. With them, there is the flavor of the task. Despite the extension of our public library system, all too large a proportion of the boys and girls who enter our colleges are painfully ignorant of the great literature of the past. They come from homes that have little of a background of culture, and such reading as they have

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done is of the most petty variety. They never have formed the friendship of books, never have been awakened by the music of a great poem, or swept away by the flood of emotion aroused by a great novel. They are, in fact, just a little afraid of the books so highly recommended to them in their courses in literature. They think that they are "highbrow," or out of date. When once their curiosity is aroused and they venture hesitatingly to taste them, then comes enthusiasm.

It is to provide the books, and the proper atmosphere for their reading, that, during the past twenty years, there have been established, in college libraries all over the country, what is known as "browsing rooms," a generic name which is rather bad, though no one has been able to invent a better. Generally the room is called by the name of the donor, or of the person in whose memory the gift is made. Such are the Farnsworth Room at Harvard, the Arthur Upson Room at Minnesota, the Tower Room at Dartmouth. When one enters a room of this kind, he passes from the atmosphere of the institution to that of the home or club. About the walls are low cases filled with attractively bound books, and above them are prints or paintings. Here and

BROWSING ROOM

there is a vase or bronze. A wood fire is burning on the hearth. Instead of the type of furniture proper to the other reading rooms, there are comfortable easy chairs; and the tables serve for the support of shaded lamps and the casual display of attractive books. The only formal note is the desk of the attendant. The books have been very carefully selected, and represent those that are, or should be, in the intellectual possession of every educated man and woman. The great poets, the essayists are represented, not alone those who wrote in English but, in original or translation, those others whose work has become a part of our intellectual heritage. Complete sets are generally absent, for only the cream is desired. The editions are well printed and bound, but not those that are most expensive. There are none that may not be freely used.

A room such as this, properly fitted, open during convenient hours, and free from regulations which merely irritate, will have a civilizing influence on the students who use it which will pay a rich dividend on the cost of the installation.

Quite as important as are the books and their setting, is the quality of the woman in charge. So essential is this that unless the institution is prepared to provide the salary of a proper person, it

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is very doubtful if it is wise to go to the large expense incident to the furnishing of the room. She should be of ripe culture, human sympathy, and social experience. Technical library training is unnecessary. A woman of this type, capable of attracting and cultivating the friendship of young people, and, by suggestion, stimulating and directing their reading, may readily become one of the most important educational forces in the college.

The space to be devoted to the browsing room is governed by no formula. There should be shelving for at least 1,000 volumes and the cases should be no more than 5 feet in height; but, aside from this, everything is a matter of comfort and good taste.

A gift which will permit the establishment of the browsing room is relatively easy to secure. The sum involved is not large and the memorial feature is appealing. In attempting to secure a gift of this sort, an effort should be made to make it sufficient to provide a small income for the renewal of books that become worn, the addition of others as necessary, and, if possible, the salary of the attendant.

CHAPTER FIVE

THE CIRCULATION DESK, THE PUBLIC CATALOGUE, COAT ROOMS AND LAVATORIES

THE CIRCULATION DESK AND THE PUBLIC CATALOGUE

The central feature of every library building, both constructionally and administratively, is the circulation desk. It is the principal point of contact between the library and its clients; and at it service must be continuous during all of the period in which the library is open. The assistants at it are responsible, not only for the loan of books and their discharge, but for the control of stack entrance, and frequently for a certain amount of supervision over the various reading rooms.

From the architectural point of view, the area before and behind the desk is, owing to its central position, the most difficult to enlarge. The allowance of space, in consequence, must be most carefully studied so that it will be adequate for future needs. It must amply provide for the public catalogue, for the readers who use it, for the

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borrowers who are waiting to be served, and for casual visitors. There must be perfect freedom of movement at every point, and the space immediately in front of the desk should be completely unobstructed. The cases for the public card catalogue will be at one side. A standard sixty-tray cabinet (arranged with ten trays in a vertical direction and six in the horizontal), occupies a floor space of approximately 43 by 30 inches. Using the factor of one and half cards per volume, such a cabinet will accommodate the catalogue of a library of 30,000 volumes. A cabinet eight trays in height is to be recommended over that of ten, since the reader, who is consulting one of the trays placed on the sliding shelf, will cause twenty per cent less inconvenience to other readers who wish to use trays in the ranges in front of him. The cabinets may be placed with their backs to a wall, or back to back in free space on the floor. In front of each cabinet, and separated from it by at least 6 feet, should be a narrow table of standing height (approximately 3' 6"), for the consultation of trays removed from the case. Near by there should be a small table, with chairs, for the convenience of readers who wish to sit while using the catalogue. The minimum floor space for each cabinet and its

PUBLIC CATALOGUE

standing table should be 6 by 9 feet. A library having 50,000 volumes will have immediate use therefore for 108 square feet for its catalogue, plus such space as is required for the small tables mentioned above. Double this space, to provide for proper circulation, and multiply the figure by the number of times 50,000 volumes which has been determined upon as the maximum future capacity of the building and its extensions, and the result will be the floor space which should be allotted to the catalogue. One-half of this floor area may be at the other end of the room, and used immediately for exhibition cases, the desk of the Reference Librarian, and shelves for the display of new and interesting books. Add to the space required for the catalogue that needed for the circulation desk and the area in front of it (500 square feet), and the total area needed for a building ultimately to house 500,000 volumes (none too large an estimate for any growing institution) will be 3,500 square feet. This is a minimum requirement.

In a few college library buildings an attempt has been made to save space, and to provide for the convenient use of the catalogue, both by the cataloguing staff and the public, by fitting the trays into a case in the wall which separates the

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cataloguing room from the circulation. The practice cannot be recommended. The space is, in the first place, definitely limited, the size of the catalogue is not; and inevitably within a few years, the plan must be given up. Then too it frequently happens that the trays, after being used, are not immediately replaced. If the ordinary type of cases are in use, the missing trays can be found in a moment, for they are seldom more than a few feet away; but if they must be sought for in two different rooms, the resulting annoyance will be very great.

The space behind the desk should be generous enough to provide working room for several more assistants than the number now on the circulation staff; but this should be done by lengthening the desk, rather than by increasing the distance between it and the entrance to the stack, which should not be more than ten to twelve feet. Every additional foot means just so much more that must be travelled a great many times a day by the assistants. If the circulation of reserved books is handled at the main desk, and not in a special reading room, additional desk space will be necessary. The issue of the reserved books and their record should be kept separate from that of the ordinary circulation, and the shelving

CIRCULATION DESK

for them should be as close as possible to the desk. In this service, rapidity is a prime requisite and every unnecessary motion should be eliminated.

In a very large number of library buildings throughout the country, the circulation desk, standing as it does in the centre of the building, cannot be given adequate natural light from windows, and sky-lighting is substituted. The result is almost always unsatisfactory. It is not easy to maintain the sky-lights in weatherproof condition; the expansion and contraction of the glass causes breakage and leaky joints, so that the cost of upkeep is considerable; the glass area is expensive to heat; and, as it is difficult to keep it clean, the volume of light which penetrates tends to decrease. Almost invariably, it is necessary to supplement it by artificial illumination.

Still more serious is the waste of space occasioned by the fact that the ceiling over the desk must be pushed up to the roof, dislocating the plan of all this section of the building. Systems of artificial lighting have improved so greatly during the last few years, and the art of illumination has become so much better understood, that there is every reason to discard all attempts to bring in natural light from above and to rely

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solely on artificial illumination. It will be only a very few years, in all probability, before the lighting engineers will have produced a commercially usable lamp that will deliver a fair equivalent of daylight, and when that time comes the last objection will be removed.

PUBLIC COAT ROOMS AND LAVATORIES

A public coat room is a necessary nuisance. Only in very large libraries is it possible to provide attendance, and without it there will be constant danger of pilfering. It will be charged, when the loss was actually due to the carelessness of the person who complains. If the room is close to the front entrance, it is unsightly; if not, it will not be used. During the interval between class periods, it will be congested; and, if the institution is coeducational, the trials of the architect and the librarian are multiplied by two. Nevertheless, we must have coat rooms, as otherwise the unsightliness will merely be transferred to the reading room. Automatically locking hooks are an alleviation, so long as they work; but when they get out of order, most emphatically they are not. The problem of the wet umbrella in educational institutions should be made the

COAT ROOMS AND LAVATORIES

subject for a doctor's thesis in some college of education! However the coat room is planned, it will probably be wrong; but nevertheless we must have coat rooms.

Public toilets, which, in every building, should be provided for both sexes, are generally located in the basement. They should be so designed and constructed that they are well ventilated and easily cleaned. The floors, walls and partitions should be of tile, or some similar non-absorbent material. If plaster walls are used they should have a hard finish and be painted white. The prime requisite in the care of these rooms is absolute cleanliness, and nothing is so stimulating to janitorial endeavor as a white surface that makes any delinquency on his part plainly evident, is easily cleaned, and looks it when the job is done. The junction between the walls and the floor should be filleted, or rounded, so that dust will not collect.

CHAPTER SIX

THE BOOK STACK, THE TREASURE ROOM, MAPS AND ARCHIVES

THE BOOK STACK

The heart of the library is the book stack. In immediate connection with the circulation desk, generally rising in a single block from basement to roof, and occupying the largest cubic area in the building, it is the reservoir on which all the rest of the building depends. Although its construction seems simple, the engineering problems involved are exceedingly complex, and those that must be solved by the architect by no means simple.

For the sake of clearness in the discussion which follows, a few definitions of the terms used in connection with it are necessary.

A compartment is a series of superimposed shelves, generally seven, supported at both ends by uprights.

A range is a series of compartments placed end to end. It may be single or double faced.

A tier is a number of ranges placed side by side and parallel.

BOOK STACK

A stack is generally a series of superimposed tiers, though the term may be used of an isolated tier.

The floor separating the tiers is called a deck.

The stack is generally placed toward the rear of the building, sometimes in a room flanked by reading rooms, offices or seminar rooms, and sometimes in a member with three exterior walls.

In some buildings recently planned, it has been placed under the reading room, or in some other naturally constricted part of the building. This is generally a mistake. Not only is it much more difficult to plan for its enlargement in future years, but in such a stack it is necessary for the pages to go down one or more flights of stairs for every book that the readers desire. This not only slows up the service but is exhausting physically. In the block type of stack, the classes of books most used are shelved on the same floor as the circulation, and only a minimum of time is necessary to get them in the hands of the reader. An electric elevator, of capacity sufficient to carry a loaded book truck and two or three people, is almost a necessity in every stack, but mechanical book delivery is out of the question in any but the largest buildings. If there is an elevator, a stack of five or six tiers or stack floors is

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perfectly easy to administer, and more than that are quite possible. The new building at the University of Rochester is planned for nineteen, and the engineers of the companies which build book stacks are prepared to go even higher. If the site on which the building is to be erected slopes toward the rear, two, perhaps three, tiers may go below the level of the circulation desk, enabling the erection of a larger number, without increasing the height of the roof, and extending the potentialities of future construction. The rear wall of the stack room should be so constructed that it can be removed, or remain as a partition, when the time comes for extension. If there can be natural light and air on three sides, so much the better, for it increases the number of carrels (cubicles for individual study) that can be provided adjacent to the windows. These carrels need not be larger than four by five feet, space enough for a desk, with a single shelf for books above it, and a chair. They should be separated one from the other by a full metal partition, or one in which the upper part is of translucent glass, and from the stack by a half partition, which in many libraries is formed by shelves for folio volumes.

The importance of such carrels cannot be over-

BOOK STACK

emphasized. They permit a degree of seclusion favorable to intensive work, and they are an aid to the rapid and unhampered consultation of the main stock of books in the subject with which the student is concerned. However good our subject catalogues may be, or may become, they cannot supply complete information regarding the resources of the library, or supplant the necessity for consultation of the books as they stand on the shelves.

For this reason it is important that the stacks should be so planned as to enable the granting of free access to all students. With proper control of the entrance, which should be close to the circulation desk, there is no reason why, in most institutions, this cannot be done. Considerable administrative inconvenience and some expense are involved, though the last is somewhat offset by the fact that the students serve themselves.

No matter how faithfully the reader may try to replace the book where he found it, it is inevitable that mistakes will be made; and a book out of place is a book for the moment, at least, lost. It will be discovered eventually; but, when next it is called for, the pages will not find it in place, the reader will not be served, and the library will be criticised. The number of books taken

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from the library without record will probably increase, and this through carelessness rather than because of any intent to steal. Most of them will eventually be returned. The danger of defacement and mutilation of the books will be somewhat greater. All these things will happen with closed stacks, of course, but less frequently. The only way that they can entirely be prevented is to lock up the stacks and to allow books to be used only under the eye of an attendant.

The college exists, however, for the purpose of providing education, and its library is justified to the extent of its contribution toward that end. If tradition, habit, personal inconvenience prevent it from giving its best service, its administration is seriously at fault. The contribution of the library to the educational process is threefold—as a storehouse of the wisdom of the past and present, in its training of students in the art of using books, and in the stimulation of interest, which is the foundation of all true education. Every librarian of experience knows of case after case of men and women whose education has been vitalized through a stimulus obtained casually, sometimes almost by accident, in a library. Too many students go about, as the phrase is, “in a fog,” not fully aware of what it is

BOOK STACK

all about. In wandering about the library, one chances on some book that catches his interest. It may be a historical novel, or some forgotten book of travel, or the biography of some one who has been to him only a name. Something about it is in tune with the mood of the moment, and he reads on and on. Another day, and it might not have affected him at all, but now he is thrilled. His imagination is stirred by a great discovery, and he begins to dig deep into the mine. What is found becomes his own property, not something that is borrowed until an examination is over. Experiences such as these are very common, and are growing more so as the rules hedging the use of our libraries are relaxed. They cannot be measured statistically, but their value, as education, outweighs books out of place, a few lost, and a good deal of bother for library assistants. "But think of the time wasted," some people say. Those who are prospecting for gold lose their time until they have found it. The time is not lost, for the mind is being stored with impressions that may have a later flowering.

The computation of the size of the stack necessary to provide shelving for the number of books for which it has been decided to build is not an easy problem. The formulæ generally used by

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architects, and the firms which manufacture book stacks, are based on the assumption that every shelf shall be full of books, a condition which is obviously impossible in any library using a modern classification, or relative instead of fixed location for its books.

A stack may be very seriously overcrowded when here and there are sections in which shelves are only partially filled, or even vacant. To utilize this space it will be necessary to shift the location of all the books that are between, an expensive and very laborious process. In every library this is occasionally necessary, for it is impossible to foresee what will be the relative growth of the various classes. As congestion increases, such shifts become more common. When the time comes that the space gained by these removals is not enough to warrant the expense of making them, the stack may be said to have reached its capacity.

Based on estimates made of the number of books actually on the shelves, in a college library, it is safe to say that when they average more than fifteen per square foot of floor area in each tier, capacity has been reached. Floor area in this computation includes space occupied by aisles, elevators and staircases, but not that by carrels.

BOOK STACK

Another formula, frequently used, is 50 volumes for every running foot of single-faced, or 100 volumes for every foot of double-faced, range. A double-faced, four-section range, 12 feet long, would theoretically hold 1,200 volumes. Actually, its working capacity will not be very much over 1,000 volumes.

Assuming that it has been determined to provide accommodations for over 100,000 volumes in a five-tier stack, each floor then must shelve 20,000 volumes. Applying the formula of fifteen volumes to the square foot of floor area, it is evident that 1,333 square feet will be necessary, or a space approximately 45 by 30 feet. With aisles of 6 feet in the centre and 3 feet on each side, there will be twenty ranges, each 9 feet long. If each foot shelves 100 volumes, the total will be 18,000, somewhat less than the 20,000 of the other formula. This very rough computation is introduced to show how the formulæ apply. In actual practice, of course, the architect must provide for staircases and an elevator shaft, and he must figure much more closely.

Whether the stack should be rated as an integral part of the construction of the building, along with the electric wiring, plumbing, etc., may be debated; but as its installation is always

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by a separate contract and involves many highly technical details, a rather full discussion is necessary.

The engineering problems incident to stack construction are so difficult, and a proper solution of them so important, that the contract for its construction and installation should be awarded to some firm that has had long experience in work of this character. There are a sufficient number of houses of this type to insure spirited bidding, and their reputation is such as to make it quite certain that, to whichever one of them the contract goes, the work will be well done. Building committees are frequently tempted to accept bids from firms which do not have this highly specialized experience, but the result is almost always unfortunate. The job may appear to be a good one when it is accepted; but, after the books are placed in the shelves, weaknesses are very likely to develop. The bracing may be insufficient to carry the heavy loads; the uprights may bulge and allow the shelves to fall or to jam; the stamping of the metal may be carelessly done and sharp edges and corners may injure the binding of the books or the hands and clothing of the attendants or readers; the enameling may chip or lose its color; the shelves and

BOOK STACK

their supports may not be accurately standardized so that the shelves are not interchangeable or easily adjusted; these and a dozen other similar things may give cause later to regret a false economy.

The stack block is generally self-supporting, the loads being carried through the stack uprights to the foundation, rendering unnecessary any other supporting columns. The height of each tier is either 7 feet or 7 feet 6 inches. Most of the recent installations have the higher figure.

Neither in the stack, nor in any other part of the building, should ranges over the standard height be permitted. The shelves beyond the reach of a person of ordinary height will not be used so long as others are available. They will be wasted metal and collectors of dust. If they are used, they are provocative of bad language and curses for the architect and the committee.

Shelves should be uniformly standardized, preferably at three feet in length, measured from centre to centre of shelf support, so as to be everywhere interchangeable. In width, there may be three standards, 8, 10 and 12 inches; or two, 9 and 11 inches.

The length of the ranges may be any convenient multiple of the shelf length. Dispropor-

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tionately long ranges should be avoided. In the ordinary installation there are aisles both at the end and in the centre. In a small stack, space can be saved by running the ranges at right angles to the circulation desk, thus avoiding the necessity for the centre aisle.

The width of the aisle between the ranges depends upon the freedom with which the stack is to be used. If the number of people having stack privileges is to be large, enough space must be allowed so that the readers and pages may pass each other without inconvenience. Even if it is determined that the stack is to be used only by the staff and faculty, it is well to keep in mind the fact that ten years from now the decision may be reversed and the wider aisle required. On the other hand, it must be remembered that every inch added to the width of the aisles increases by so much the cost of the building or decreases the total capacity of the stack.

In laying out a stack the unit of measurement should be the distance between the centres of the uprights supporting the ranges. If this unit is 52 inches, the width of the aisles will be 32 inches for 10-inch shelves; and 36, where 8-inch shelves are used. Some installations have 54 inches between centres and some as low as 48 inches. The

BOOK STACK

latter figure cannot be recommended. The lower limit should be 50 inches and the upper 54.

A very large majority of the books in the college library require shelving no more than 8 inches in width. If the arrangement of the books is in three sizes, the proportion of each will be roughly:

Octavo and below . .	85 per cent	8-inch shelves
Quarto	12 per cent	10-inch shelves
Folio	4 per cent	12-inch shelves

It will add very greatly to the flexibility of the use of the stack if the vertical shelf supports are so planned as to accommodate shelves of any of these widths. It is impossible to predict, over a period of years, where the various classes of books, and the categories of size within these classes, will be most conveniently located. It should be possible to put them anywhere.

In addition to these three standard widths of shelves, there should be, on each deck of the stack, provision for the shelving of atlases and other books over 18 inches high. Such books should always be laid flat rather than stood upright. Shelves of a single standard of size, 18 by 28 inches, spaced 4 inches apart, are recommended. Any waste of space, occasioned by the use of so large a shelf, is more than compensated

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for by the greater flexibility in use. A convenient place for the installation of these is on the aisle off of which open the carrels. A block of such shelves, 4 feet in height, will serve as a partial partition for the carrel. Roller shelves are sometimes used. They are good, but expensive and unnecessary except for finely bound books.

A collection of books on art and architecture will require a larger number of shelves both for folios and oversize books.

A special stack should be provided for newspapers. The size and spacing of the shelves should be similar to that used for ordinary oversized books, but the type of construction may be simpler and less expensive. Frequently newspapers are shelved on ordinary double-faced ranges by allowing the volumes to occupy the shelves opposite each other on both faces of the range. This is uneconomical of space, both for the reason that the shelves are longer than is necessary and, since the ranges have become virtually single faced, twice the amount of aisle space is required over that of a double-faced range of newspaper shelving.

Three types of stack are in general use: (a) the standard sheet steel stack, with shelf supports of sheet steel, slotted to receive the shelves,

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made by the Art Metal Construction Company, the General Fireproofing Company, the Library Bureau, and Snead & Company; (b) the standard cast iron stack, with shelf supports notched to receive pins fixed on the ends of the shelves, made by Snead & Company; and (c) the steel bracket stack, with post uprights and projecting shelves, made by all these companies. The last type is the cheapest, but neither in appearance nor in use is it so satisfactory as the standard.

The deck floors separating the tiers are constructed of white marble, slate, or concrete. Of these substances the white marble is by far the best, both on account of its value in reflecting and distributing light and as an incentive to cleanliness. Slate is equally rigid but, as its color is always dark, it absorbs rather than reflects the light. Formerly glass was extensively used, but in recent years it is very seldom employed. The argument for it was that, being translucent, the light on one tier will penetrate to those above and below. In practice, the volume of the transmitted light is too small to be of any service. If glass is used it should be wired, as an insurance against breakage and consequent accidents, too many of which have occurred in libraries using this type of flooring.

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Deck floors of reinforced concrete are gaining in popularity. They are cheap, but unless they are covered with tile, difficult to keep clean. Unless the tile is light in color, it does not reflect the light. Concrete covered with white rubber tiling would be somewhat expensive, but almost ideal in use.

The importance of the use of light-reflecting surfaces in the stack room has, until recently, been underestimated. In a very large number of installations the metal has been finished in dark colors and practically all of the light that impinges upon it is absorbed. It is consequently necessary to use a larger wattage if there is to be adequate illumination. The reflection from the backs of the books is negligible, and that from the front edge of the shelf too small to be taken into account. All other surfaces, consequently, should be finished in as light a color as is possible. The reflection from a white surface may run as high as 80 per cent, cream to 74 per cent, while dark blue is 3 per cent to 9 per cent, olive green 13 per cent, walnut 7 per cent. The conclusion is obvious.

The fact that the plane to be lighted is vertical rather than horizontal, with a consequent rapid decrease in the effectiveness of the illumination

STACK LIGHTING

as the distance from the lamp increases (amounting sometimes to as much as 50 per cent within the range of a foot), makes the problem one of great difficulty. It is of the utmost importance that the distribution shall be made as uniform as possible. Although the eye quickly adapts itself to difference in illumination, the accommodation is not sufficiently rapid to cope adequately with the different intensities that exist on the face of any stack range. If the consultation of the shelves, or the search for a particular book, is to be rapid and accurate there must be effective illumination.

The outlets for the lighting of the central and side aisles may be spaced up to 16 feet, but in the aisles between the ranges a spacing of $7\frac{1}{2}$ feet is the maximum. A Mazda 60-watt frosted lamp has shown itself to be the most effective in such an installation. Above this should be some type of reflector and eye guard. Excellent service is given by a prismatic glass enclosing unit, but the cost is somewhat high, and it is difficult to keep clean. A special type of metal reflector, manufactured by one of the leading stack companies at a considerably lower cost, gives very satisfactory results. In a slightly less degree, good results are obtained by the use of a deep

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opal glass reflector. The entire fixture should project as little as possible from the floor above, so as to give head room; and it should be easy to clean, as dust seriously decreases reflecting power. Sockets into which the lamp can be locked will discourage thievery.

Switches controlling the lights in each aisle should operate from either end of each range. A three-wire system, with an indicating lamp at the circulation desk to show when any of the lamps in the stack are operating, and a switch for unit control, will be of great convenience.

Even under the most satisfactory conditions, the amount of daylight that can penetrate the stack aisles is too small to be of consequence. It is useful for the carrels and the side aisles, but any attempt to plan the stack so that the other aisles may have natural light results in a waste of space for which the saving in the cost of electric current is no sufficient compensation. For motives of convenience, as well as economy of space, staircases, elevators, book-lifts and conveyors should be centralized in location, either in the centre of the stack or contiguous to the circulation desk. Only when the floor area is large is more than one staircase necessary.

In every stack room where there is general ad-

TREASURE ROOM

mission, there should be a section, separated from the main body of the stack by grills and a locked door, in which can be segregated the books which for one reason or another should not be on open shelves. These grills may readily be made adjustable so that the inclosed space can be enlarged at will.

THE TREASURE ROOM

Every library, no matter how small, is likely to have books, valuable because of age, artistic printing, illustration, association, or as first editions; and if there can be a room where those of the greatest significance can be kept in safety, and from time to time displayed, the library will be fulfilling one of its major cultural functions. Such a room has come to be called a Treasure Room. Even if it cannot be kept open continuously, students may be admitted to it in groups, and the importance of its contents explained.

It is a thrilling experience, to a student of any imagination, to see a fragment of papyrus, a parchment roll, a Babylonian tablet, or a manuscript on vellum; and to be able to trace the history of the book on through the work of the early printers and their artistic successors to the pres-

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ent day. It is one of the things which give reality to history.

Such a room invites gifts to fill it that will add greatly to the cultural resources of the library. A tactful librarian can, within a few years, create such an illustrative collection with very small cost to the college. No very large amount of floor space is necessary, for if the wall cases provided later prove insufficient, a part of their contents can be transferred to the locked section of the stack. The book cases should have locked glass-paned doors, or metal grills. The former are to be preferred as they keep out the dust. One or more glass-topped display tables may occupy the centre of the room and a single desk and chair may stand beside the window.

Supplementing the exhibition space in this room may be similar display tables in the entrance hall near the circulation desk, and vertical cases recessed into the walls, so that the glass doors will be flush with its surface. In these cases all sorts of things may be shown, books from the Treasure Room, books and manuscripts connected with the history of the college, photographs, prints, book plates,—anything that will interest and instruct. If these exhibits are frequently changed, standing as they do at the

ARCHIVES AND MAPS

point where the students congregate, they will have a large cultural value.

Adjacent to the Treasure Room may be a vault, for the safeguarding of the most valuable material, but this is not to be advised for a small building. A large safe will answer the purpose at a much lower cost.

ARCHIVES

Most colleges maintain a collection of books and documents relating to their own history, files of their catalogues and other official publications, volumes of old records, student publications and those of the alumni. These may be kept in a locked section of the stack, in the Treasure Room, or it may be considered to be advisable to set aside a small room for the installation of the collection. Such a room might be used as the office of an alumni secretary. Book cases in such a room should be similar in type to those in the Treasure Room, though less elaborate.

MAPS

A collection of maps, if the college possesses it, requires specially constructed cases for its in-

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stallation, and large tables for its use. It is difficult to find proper space for them except in a room designated for that purpose. Metal cases containing shallow drawers, measuring 48 by 36 in., and not more than 2 in. deep, are most satisfactory; but wooden or heavy pasteboard boxes of the same dimensions resting on shelves a little larger in size, and spaced about 3 in. apart, may be used as a substitute. The front of the box should be hinged at the bottom; and the top, at half its depth, so that the maps within may easily be removed and replaced. Vertical cases, such as are sometimes found in architects' offices, are sometimes used, but they are not very satisfactory.

CHAPTER SEVEN

THE ADMINISTRATIVE OFFICES, ORDER AND CATALOGUING ROOMS

A fault common to a large proportion of the college library buildings now in use is the failure to provide adequate office space for the administrative and technical duties of the staff. When these buildings were constructed, the staff was small; and it does not seem to have occurred to the authorities that it would ever be larger. Even at the beginning, the space was cramped and insufficient; and it has become progressively hampering as the years have gone on.

The types of work incident to the operation of a library are the same, whether it is small or large. They differ only in degree. As a staff grows the processes are differentiated, but very little that is new is added. Books must be ordered, involving the verification of the titles by means of bibliographies of various types, an estimate of the cost, the examination of the catalogue and the order file to insure against duplication, the writing of the order slip and the order itself. When the book is received it must be checked from the bill, its price compared with the order and entered on the order slip and in the

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ledger. The book must then be plated, its leaves cut and an examination made to determine if it is complete. Some sort of an accession record is then made. The process of cataloguing involves enough of a study of the book to determine its place in the classification, the subject headings under which it is to appear in the catalogue, the establishment of the call number, the determination of the full name of the author, the writing of the cards (author, subjects, editor, translator and shelf list) and the filing of these cards in the proper places. The call number must be entered inside the book and on the back before it is sent to the shelves. Periodicals and other serials, received by subscription or by gift, have an entirely different set of records. Each number must be checked as it comes in, and missing numbers claimed. When the volumes are sent to the bindery they must be carefully examined to ascertain if they are complete, the type and style of binding determined, the directions for the binder written, and a record of the contents of each shipment made. When the books are returned, the bills must be checked, each book compared with the directions given, plated and accessioned. It then goes to the cataloguer, who records it in the public catalogue and the shelf list.

ADMINISTRATIVE OFFICES

This very brief outline of processes, which omits all but the most important, is given in this detail as evidence of the fact that to accomplish them in an orderly way, a generous amount of floor space is necessary; and that it must be so arranged that the work may be done with a minimum expenditure of time and labor.

It is of prime importance that these offices should be on the same floor as the public catalogue and as close to it as possible. There should be, as well, immediate entrance to the stack. The assistants have frequent occasion to consult the catalogue, and the books on the shelves, and a few feet of distance, still more a flight of stairs, will entail an aggregate loss of time and an expenditure of strength that, during the year, will be extensive.

All of these processes of preparation of the book for the shelves may very well, in a small building, be carried on in a single large room, which should have a minimum size of 500 square feet. Each assistant should have, including space for the necessary furniture, the movement of book trucks, etc., an allowance of 100 square feet of space, but even if the number of assistants, who at the beginning are to work in it, is less than five, the types of work and the essential

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records are a constant and must be provided for. The staff will quite certainly increase in size, and this should be anticipated in the plan, for it is seldom possible to provide additional office space, other than at the time of a reconstruction of the building. Other rooms, in another part of the building, may be used, but the various tasks of preparation are so interrelated and so many of the same records must be used that, under such a condition there is loss of time, with a consequent increase in the cost of administration.

In a fairly large building, it may be wise to divide the space, using one room for the order department and the other for work on the catalogue. Between them there should be another room, accessible to the public, where are shelved the bibliographical tools used in common by both departments, and frequently by faculty and students. Generally, however, the single large room is a more economical use of space, and more flexible in use. In either case, there must be a generous provision of wall shelving.

RECEIVING AND SHIPPING ROOM

As an adjunct to the order department, there must be a receiving and shipping room, where boxes are unpacked, shipments sorted, unsightly

ADMINISTRATIVE OFFICES

material stored and odd jobs of all sorts done. This should be under the order department, and connected with it by some sort of an elevator or lift. If the room is sub-surface, some mechanical means must be provided for lowering heavy cases of books from the dray to the level of the room.

LIBRARIAN'S OFFICE

The office of the librarian should be adjacent to, though not necessarily connected with, the order and the catalogue department. It should be so placed as to be easily accessible to the public and large enough so that it will accommodate conferences with members of the staff, with groups of the faculty for the discussion of library problems, and the meetings of the library committee. An ante-room for the librarian's secretary or stenographer is a great convenience.

LAVATORIES

Books are very dirty things, as every one who uses a library very well knows, and as an alleviation and antidote there should be a lavatory, or better a toilet room, opening off the work room. The saving of time incident to this will pay a high interest on the cost of installation. A lava-

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tory or two for the use of readers in the stack is well worth while.

STAFF ROOMS

It has become almost a commonplace in library planning that there should be provision for the comfort and convenience of the staff. The minimum should be a rest room, provided with two or three couches and a first aid cabinet, a locker room, and a toilet room. The rest room will not infrequently be called upon for emergency service to readers. At the University of Michigan Library it has been found necessary to equip such a room opening out of the main reading room. In many places a lunch room, with a simple kitchenette, is necessary.

Although college libraries are so generally staffed by women that the feminine pronoun is generic, it is well to make some provision for possible men employees.

STORAGE AND JANITORS' CLOSETS

Some space must be provided for the storage of boxes, furniture discarded or temporarily out of use, impedimenta of all sorts. For this unlighted areas in the basement are quite satisfactory. The janitors must have places for mops,

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brooms and other equipment. As the cleaning must largely be done when the building is unoccupied, during a considerable period of the day when they are on duty, there is little that they can do. There should be a place where they can sit and meditate on the state of the universe.

BINDING AND BOOK REPAIRS

The installation of a bindery is not to be recommended. Except in very unusual circumstances and in very large libraries, it is at once less expensive and more satisfactory to have the work done outside. It is a convenience, of course, if the books and periodicals which are being bound can be produced to satisfy an emergency demand. The period of maximum use of a volume of periodicals is exactly that in which it is being bound; but if the loss of parts is to be prevented, the volume should go to the bindery as soon as possible after its completion. The conflict of interest is inevitable. If it is known that, while they are in process of binding, books can be produced, there will be insistent demands for them, occasioning an expensive search and a much greater danger of loss. If the books are unavailable, the demand will less frequently arise.

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The overhead costs of running a bindery decrease as the volume of work increases; and, unless the binding appropriation is in excess of \$10,000, it is more economical to have it done under contract with some firm that specializes in this type of work.

The repair of books is another matter, and every library should have a convenient place and the equipment for it. A stapling machine, book binder's shears, a screw press, such as used to be employed for copying letters, and a few simple tools and materials, are all that is necessary, though a guillotine paper cutter is a great convenience. A small room in the basement may be assigned for this purpose, or the work may be done in the receiving and shipping room.

PHOTOSTAT

A photostat machine is coming to be considered as necessary in every good-sized library. The costs of its operation can very nearly be met by work done for other departments and for individuals. A room containing a minimum area of about 300 square feet is necessary for the installation of the machine, a dark room and the accessories.

CHAPTER EIGHT

THE EQUIPMENT OF THE BUILDING: FLOORS AND FLOORING, LIGHTING, HEATING AND VENTILATION, THE PREVENTION OF NOISE, COSTS

FLOORS AND FLOORING

In the selection of flooring materials, a number of things, aside from the cost, must be taken into account. Consideration should be given to its wearing quality and the cost of its maintenance in good condition, to the ease with which it is kept clean, to its resistance to stain, to its appearance, comfort and resiliency.

Until recently, wooden floors have been taken almost for granted, but their use is steadily decreasing. It is difficult to get properly seasoned lumber that will not shrink after it is laid. Wooden floors are not easy to keep clean, they require frequent refinishing, and they are noisy.

If wood is used, it should be covered, in reading rooms and wherever there is much traffic, by some other material.

"Battleship" linoleum is frequently used, but it is neither as resistant to wear, as easy to keep clean or as attractive in appearance as some

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other substances. It may be used in the seminar rooms, studies and offices. Very much more satisfactory is a flooring of tile, of ground cork, of asphalt, or of rubber.

Cork tiles are of two types: those in which the ground cork is mixed with oxidized linseed oil and various gums and pigments, before being pressed into the forms, and those in which, without mixture of other substances, the cork is pressed into moulds and baked. The second is the better. Among the firms manufacturing this sort of flooring may be mentioned the United Cork Companies of Lyndhurst, New Jersey, and the Armstrong Cork Company of Lancaster, Pennsylvania. A coat of wax, applied two or three times a year, and polished, will keep the cork tiling in excellent condition.

Approximately of the same cost are tiles composed of asphalt, or asphalt with asbestos, of which there are several varieties on the market. A floor of this sort is resilient, easy to keep clean and attractive in appearance. Generally the tiles are $\frac{3}{16}$ of an inch in thickness and are cemented to a concrete base, though they may be laid on a wooden floor. Trade names for this material are Johns-Manville, Hanstile, Duraflex, Tile-Text, etc.

FLOORS AND FLOORING

Somewhat more expensive, but having many points of superiority, is tile made of rubber. A floor covering of this sort is almost ideal. It is more resilient, less easily abraded and stained, less likely to be marred by the legs of chairs and tables. As it is manufactured in lighter colors than cork or asphalt, its quality of light reflection is, in certain situations, of great importance.

In service rooms, where no floor covering is required, the cement floors should either be painted, or treated with some preparation like Compolite, so that the surface is not ground into dust and that it may readily be kept clean.

Uniformity of treatment of the floors throughout the building is entirely unnecessary. Where the use is heaviest, as for example about the circulation desk and the public catalogue, rubber may be used; the reading rooms may be floored with cork; the other public rooms and the offices with tile; while cement may be used in the receiving room and in the basement.

LIGHTING

In hardly any other particular of the planning and construction of library buildings has there been a more marked development during recent years than in the attention given to lighting, both

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natural and artificial. In numerous tests made by industrial companies, it has been proved that both the speed and accuracy of an office force increases with improvements in the quality and quantity of the lighting, and there is no doubt that the same principle applies in the library.

The science of illumination is still, however, in its infancy. It has yet to be determined with accuracy what is, physiologically and psychologically, the optimum intensity. While there have been enormous improvements in the efficiency of luminaries, and in the quality of light which they deliver, there is no doubt that further progress will be made. In planning any lighting system four things must be kept in mind: the intensity of light desired (foot candles on the reading plane), its quality, its æsthetic effect and its cost.

Not very much need be said concerning natural illumination by windows, for the principles involved do not differ materially from those governing other buildings used for educational purposes. Roughly the window area should equal 20 per cent of the floor area. This, however, should not be accepted as a universal formula, as in sections where the air is clear and cloudless and the light strong, the fenestration obviously need not

LIGHTING

be so extensive as it is in regions where the sun is frequently obscured. A southern exposure needs less window space than a northern. The architect will naturally take these facts into account; though, in consequence of the necessity for a certain degree of uniformity in the fenestration, as seen from the outside, it may be impossible to furnish in every room an ideal illumination. Too much window space is wasteful of heat, since it requires roughly five times as many units to heat a square foot of window area as is needed per square foot of exterior wall. Too small windows necessitate an undue consumption of electric current and shorten the life of the lamps.

The higher the window, the wider is the distribution of the light which enters it. Effective illumination will extend into the room about one and one-half times the height of the tops of the windows from the floor. This presupposes, of course, that the light from the top of the window is not excluded or reduced by shades. It is certainly uneconomical to heat glass area that does not furnish a compensating light. Windows which extend nearly or quite to the floor are to be avoided for this reason. Venetian blinds are much more satisfactory than roller shades. Experiments have shown that, properly adjusted, they

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increase rather than diminish the penetration of light. If roller shades are used they should be in two sections, so that the desks near to the windows may be protected from direct sunlight and the remainder of the room will have adequate light.

The spacing of the windows should be such that bookcases of standard width (three feet, or a multiple) may be installed in the spaces between them. Those in the reading rooms may be raised above the floor so that, beneath them, wall shelving may be continuous.

Sunlight is good for humans but it is bad for books. It is deteriorating both to paper and to binding, and as far as possible books should be protected from it. In ideal book storage there would be no natural light at all. The stack for the rare books at the Huntington Library has only artificial illumination, and the air is conditioned at a constant degree of temperature and humidity. Recently the windows, which when the building was constructed were planned to light the public exhibition room, have been bricked up, the better to preserve the priceless books and manuscripts which are shown.

The time may come when we will have windowless libraries, as we now have museums, with-

LIGHTING

out outside illumination; but, for psychological reasons, if for no other, this is now impossible.

There is no doubt whatever that there is a constantly increasing demand for greater intensity of artificial illumination. Three generations ago a couple of candles were sufficient to light a desk; but that day is past. An installation that was considered quite adequate twenty years ago now fails to satisfy. How far this tendency is to go no one can say; but it is at present so marked that, in planning any new building, it must be taken into account. The wiring should be capable of carrying a load considerably in excess of present maximum demands, and outlets should be so distributed as to allow great flexibility in the future installation of fixtures. Even though it may be determined to rely on ceiling illumination, there should be a sufficient number of outlets in the floor so that desk fixtures may later be installed.

While there is no consensus of opinion as to the optimum amount of light required for reading, there is little doubt that in most of our libraries the lighting is insufficient. Photometric measurements, which every department of physics is equipped to make, will reveal conditions both as to intensity and distribution that are generally surprising. On the same table there may

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be a variation of from two to four foot candles.

For hallways and other parts of the building where reading is incidental, from 3.0 to 4.0 foot candles is sufficient, but in the reading rooms, at the circulation desk and in offices and seminar rooms, from 7.5 to 10.0 foot candles on the reading plane should be supplied.

The distribution of illumination so as to eliminate both glare and dark shadows is of the utmost importance. Speaking generally, both may be avoided by multiplying the number of luminaries of relatively low wattage. If these are so wired that only so many of them as is necessary need be used, the saving in current will in a very few years compensate for the extra cost of installation.

The reading room of necessity must have general illumination. Whether in addition there shall be table lighting is a matter of opinion and of cost. From the æsthetic point of view there is no doubt that general illumination is to be preferred; but unless the room can have a ceiling that is light reflecting, and unless that ceiling is kept clean, it is exceedingly difficult to secure a sufficient amount of light on the reading plane without employing a wattage in the luminaries that will produce an unpleasant glare. Cove

LIGHTING

lighting, used so successfully in banks and business houses, has seldom been employed in libraries, no doubt on account of the expense. One of the most successful examples of a totally indirect system of general illumination is that in use in the reading room of the University of Michigan. The ceiling is a barrel vault finished in white. Concealed in the tops of the book cases surrounding the room, and spaced about four feet apart, are a series of 100-watt lights set in asymmetrical silvered glass reflectors. The beams of light play on, and are reflected by, the white vaulted ceiling. The deterioration of the system is, however, very rapid. Although the ceiling is periodically cleaned and restored, the effective illumination is said to average less than 50 per cent of its initial value.

Supplementing the general illumination are specially designed table lamps, which are described in detail in the Transactions of the Illuminating Engineering Society, volume 21, pages 567-87. The primary source of the light in these lamps is a row of small incandescent lights so spaced as to give practically uniform brightness to the opal glass and uniformly distributed illumination of 10 foot candles on the table beneath.

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There are, of course, many types of fixtures available, any one of which may be acceptable, provided it has no light source visible to the reader working at the desk, that the illumination is uniformly distributed and that there is no glare. Table lamps should be on a three-wire system, admitting of individual or general control. The lamps, in fixtures used for general illumination, should be enclosed within diffusing globes and should hang from $8\frac{1}{2}$ to 9 feet from the floor.

Assuming the use of lamps of 150 to 300 watts, the amount of wattage necessary for general illumination and for table illumination may be determined roughly by multiplying the number of square feet of floor area by 0.7 (watts), to give an illumination of 3 foot candles; and by 2, to produce an illumination of 9 foot candles on the reading plane.

Thus, for general illumination in a room 25 x 25 feet, 1,200 watts will be needed if 9 foot candles are required, and 430 watts if 3 foot candles are desired. This might be distributed by four 300-watt lamps, spaced $12\frac{1}{2}$ feet apart and $6\frac{1}{2}$ feet from the walls, for the higher illumination, or 100-watt lamps similarly placed for the lower. The larger the number of luminaries, the better the diffusion.

LIGHTING

It is seldom that any general system of illumination is sufficient for the easy identification of the reference books in the cases on the walls about the room. Small tubular lamps concealed in the cornice at the top of the book case should be provided.

The cases for the public catalogue should have individual illumination installed in the cornice at the top of the case and protected by a reflecting shade so that the light will be reflected downward and the source remain invisible.

Particular attention must be given to the lighting of the circulation desk, with the area behind it, and to the cataloguing room and other staff offices, for the speed and accuracy of the work done there will measurably depend on its effectiveness.

The specifications for all lighting fixtures should provide for their acceptance only after a series of tests, made after actual installation, has demonstrated that they deliver the required illumination. It must be remembered too that, in any system of lighting, there is a shrinkage in efficiency due to the dust on the surrounding globes and the wear of the filaments, and this must be taken into account in estimating the illumination required.

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The lighting of the stacks has already been discussed in the chapter relating to them and it need not be repeated here.

A table, showing the amount of illumination, in foot candles, necessary in rooms of various types, which appeared in an article on library planning by J. F. Larson (*Architectural Forum*, June, 1931), is reprinted as a useful summary of good practice.

<i>Room</i>	<i>General</i>	<i>Local</i>
Reserve book, delivery, and reading room	10 foot candles	
General delivery and card catalogue rooms . . .	5 foot candles	8 foot candles on cases
Magazine and newspaper room	10 foot candles	
Reference reading room	3 foot candles	10 foot candles
Recreational reading room	3 foot candles	10 foot candles
Treasure room . . .	3 foot candles	10 foot candles
Study rooms	3 foot candles	10 foot candles
Seminar rooms . .	10 foot candles	
Offices	10 foot candles	
Faculty studies . .	3 foot candles	10 foot candles
Entrances	5 foot candles	
Halls and corridors	3 foot candles	
Toilets	5 foot candles	
Janitors, service, unpacking rooms, etc.	8 foot candles	
Stacks	1½ foot candles on the vertical plane.	

HEATING

The science of illumination is developing with such rapidity that it is well to require the architect, in his planning of the lighting, to associate with himself a competent illuminating engineer. His fee will be amply compensated by the adequacy of the lighting and the reduction in the cost of operation.

HEATING AND VENTILATION

Central heating plants have become so common on college campuses that it is seldom necessary to provide for a heating plant within the building. There is a consequent saving in cubage, a lessened danger from fire and a much smaller amount of dust with which the building staff must contend. Where there is no central heating plant, the architect must make careful provision for boilers and coal bunkers, so that the incidental noise and dust will be as little disturbing as possible. If the ordinary type of plant is to be installed, the outlet of the chimney should be high enough to prevent any possibility that smoke, fly ash, and furnace fumes may be blown into the building. A smokeless plant may be slightly more costly to install, but its advantages are worth what they cost. Sections of the country

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where gas is available are fortunate, but an oil-consuming plant is almost everywhere possible. The cost of the storage tank outside will be less than that of the cubage that must be devoted to coal bunkers, and the cost of operation will be less.

In most buildings the advantages of an indirect system of heating, taking into account the cost, are questionable. Fans are expensive to run, hard to control, and inevitably get out of order. Direct heating by radiators is still the most generally satisfactory method. These radiators, wherever possible, should be installed in front of the windows, both for the reason that so placed they are most effective in heating, and the wall space is conserved for book cases. In occasional instances, radiators have been placed behind wall book cases with an air intake below and a vent above the case. This practice is not to be recommended, since it is very difficult to insulate the back of the book case sufficiently to avoid damage to the books, and it is difficult to keep the radiators clean and in order. Wall radiators are suitable in some cases; and the type that is hung on brackets a few inches from the floor, reduces considerably the labor of keeping the room clean. If for æsthetic reasons it is desired to have the

HEATING

radiators covered and concealed, this can readily be done; but, when such covering is used, the size of the radiators must be increased by about 25 per cent over that of exposed radiators to compensate for the lowered heating capacity.

There are available two types of thermostatic control; the one in which each radiator supply valve has, as a part of it, a thermostatic unit which regulates the amount of steam entering the radiator; the other in which the thermostat is placed on the wall of the room and, acting through some type of motor, controls all of the radiators in the room. The cost of installation and maintenance of the latter system is greater than that of the former. Both of these systems are effective when they are in order; but they require the frequent attention of a mechanic, if they are to produce a proper result. In the reading rooms and in the stack room such thermostatic control is desirable, but in the smaller rooms there is less reason for it. People who work in the offices, the cataloguing room, and in the seminars, like to do their own heat regulation and they are apt to attempt it by "monkeying" with the thermostat, with results that are seldom happy. It is rather more satisfactory in such rooms to have manual control, using a modulating valve by

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which a variation from full off to full on is accomplished by the turning of a handle through less than a full turn, with intermediate positions for partial heating. The outlets of the radiators should be controlled by valves, which are in reality steam traps, discharging air and water but no steam, and removing all pressure from the radiators. Such valves make unnecessary the air vents which would otherwise be required. A rough estimation of the costs may be made by use of the following facts.

The amount of radiation required in coldest weather for a library building of brick and masonry construction in states north of 40 degrees north latitude is approximately 1 square foot of direct exposed radiation for 60 cubic feet of space to be heated; while south of this, 80 cubic feet may be cared for by this surface. If these radiators are concealed the surfaces should be increased, 1 square foot being used for 40 cubic feet in the north and 56 cubic feet in the south.

The cost of a heating system will vary from \$1.75 per square foot to \$3.00 per square foot, depending on the equipment supplied with the system. The fuel cost for heating 1,000 cubic feet of space, with coal at \$10.00 per short ton, amounts to \$5.00 per season in places north of 40 degrees

VENTILATION

north latitude, and \$3.75 for those south of this. The labor and supply cost amounts to from \$1.75 to \$3.50 per ton of coal.

The proper ventilation of library buildings is a thorny subject. Under ideal conditions, the building would be supplied with washed and humidified air, properly heated in winter and cooled in summer. Unfortunately conditions are seldom ideal. Those who use the library demand open windows, and an open window will put out of commission the best system of plenum ventilation that was ever invented. Hundreds of thousands of dollars have been wasted, in educational buildings in this country, in the installation of ventilating apparatus that has proved ineffective, or too expensive to operate, and as a result has been abandoned.

During the last dozen years our ideas of what constitutes "bad air" have been revolutionized. It is not because of a deficiency of oxygen, or a surplus of carbon dioxide, that air is bad; it is because it is stagnant, lacking in humidity, or overheated. Again and again it has been shown that rooms in which the air is intolerably oppressive can be made perfectly comfortable by the installation of a few electric fans to keep the air in motion. In Northern winters the air in our homes

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and public buildings is far too dry. As the temperature falls, the moisture content of the air outside is reduced. At zero the amount remaining is almost negligible, the saturation point being 0.5 (grains per cubic foot) as opposed to 7.5 at 68 degrees or $\frac{1}{15}$ of normal. When this air is drawn indoors, its moisture content is no greater than it was outside, and unless water vapor is in some way introduced, a higher degree of temperature is necessary for comfort. There is difference of opinion among the authorities as to the physiological necessity for humidification. Dr. Winslow, Professor of Public Health at Yale, goes so far as to say: "It does not seem that there is at present any sound evidence which justifies the humidification of the air of the ordinary room on physiological grounds." There are other equally competent people who take a different view.

It is a matter of common experience that in the spring or early fall, when there is no artificial heating, people will sit quite comfortably in a room at 60 degrees, or even below, but they will complain bitterly of the cold should the temperature fall to anything like this during the winter months.

There is no doubt whatever about the effect of

VENTILATION

hot dry air on books and bindings; and, even if we disregard the people who use them, there is ample reason for air conditioning. Experiments at the Bureau of Standards have demonstrated conclusively that the deterioration of all paper, and particularly of the types that have been used during the last fifty years, is much more rapid where there is too much heat and too little water vapor.

An ideal system of humidification, operating at a low cost, is yet to be devised; but there are in the market various devices which give results good enough to warrant installation. If they are used nowhere else, they should certainly be installed in the stack room where the windows can be kept closed.

In the reading rooms and cataloguing rooms, it is desirable to use some apparatus such as the "Univent" or the "Peervent," which takes air either from outside, or from within the room, heats it and discharges it in such a manner as to affect the circulation in the entire room. Air movement is what is necessary. In most cases leakage through windows and doors will supply all the fresh air that is needed.

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THE PREVENTION OF NOISE

There are some individuals so fortunate that they are able to concentrate mentally in the presence of no matter how great a racket, but they are few; and even with them it can only be at an expense of nerve energy which should have better employment. Most of us must have quiet, if we are to do effective work, and our library buildings should be so planned and constructed as to give us a maximum of it.

The thing which we call noise is the result of a conflict of sound waves. These waves, originating at any point, travel outward in all directions until they meet a wall, a ceiling, or other reflecting surface, at which point a part of the sound is absorbed and the remainder travels backward and forward, meeting the waves reflected from other surfaces, until it disappears. The control of the noise is possible if sound-absorbing, rather than sound-reflecting, surfaces are used at proper places in the room.

There are two types of noise with which we must contend: that due to the operation of machinery, which sets up vibrations that are transmitted by the structural members of the build-

PREVENTION OF NOISE

ing; and that which is the result of sounds originating within the room, air vibrations set in motion by conversation, by the impact of shoes on a floor, by the movement of chairs, and the operation of typewriters. Unless the sounds originate without the building (and Mr. Maxim promises us that soon we shall be able to deal with them) most of the others can be dealt with so that they are tolerable.

In the selection of machinery which is to operate in the building, great care should be taken to choose a type which, in operation, is as noiseless as possible. Some elevators are noisy and others are much less so, and the same thing is true of engines, electric motors, and pumps. It is as easy to secure the one as the other. To diminish such noise as is inevitably incident to its operation, all heavy machinery should be set on a base, built up of successive materials, each having a different rate of vibration, so that those which are set in motion are largely absorbed before they reach the floors and walls. The walls, ceilings and conduits may be insulated, still further to confine the noise within the room.

The best way to deal with the noise of the other sort is at the source. Floor coverings should be of cork, tile or rubber, the legs of chairs should

PREVENTION OF NOISE

be provided with a foot which will glide over the floor without scraping, book trucks with rubber tires, typewriters should be placed on a pad of heavy felt, and if machines of the ordinary type are used they should be enclosed in sound-deadening cases. A hard-finished wall is, however, one of the best possible reflectors of sound, and a certain amount of noise is inevitable. Unless it is controlled, it is annoying.

Fortunately, the acoustical engineers have been busy during recent years; and the things that they are able to do seem almost uncanny. By the use of sound-absorbing materials, of the type of the Johns-Manville Sanacoustic tile, skillfully applied on ceilings, walls, or both, they are able to convert a room that is abominably noisy into one of comfort. The word tile is a misnomer, for it consists, behind a perforated metal covering, of a layer, about an inch thick, of felted spun limestone. Other manufacturers use slightly different materials, but the principle is the same. The face of the tiles can be finished so as not to be noticeable. The determination of the surfaces to be covered is a highly technical matter, and it should be made by an expert thoroughly familiar with acoustics, and with the material he is using.

In rooms where it is undesirable to apply

COSTS

sound-deadening tile, a good deal can be done with rugs and hangings.

Particular attention should be given to the treatment of the cataloguing room. The noise from typewriters is particularly disturbing to high-strung nerves. The rapidity and accuracy with which a cataloguer works is largely dependent on the quickness of her apprehension of the subject matter of the book with which she is dealing, and every condition which makes concentration difficult should be eliminated.

COSTS

Scarcely a year passes when some American college library, representing the accumulations of a generation or more of devoted labor, has not been destroyed by fire. There are scores of other libraries, housed in buildings of non-fireproof construction, that are in danger every day of the year. Even though the fire may be localized and extinguished, the chances are very strong that the books will be ruined by water, an enemy scarcely less potent than fire itself. No insurance policy that can be written will cover a loss such as this, for it involves not only the books, but all of the time and money that has been expended on their selection, acquisition and cataloguing.

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Since the cost of fireproof construction is relatively so little more than that of non-fireproof, it is folly to use the latter; and in very few, if any, recent buildings has it been employed. Against the extra cost of fire-resisting material must be set, too, the lower expense of insurance and maintenance.

It is not sufficient to construct a fireproof stack room and the rest of the building of cheaper materials. Fire doors separating two sections of the building do not always close; and, even if they do operate successfully, the danger from water is as great as ever.

In most sections of the country it is possible at present to construct a thoroughly good fireproof building at a cost, including equipment, of from fifty to sixty cents per cubic foot. The Rush Rhees Library, recently constructed at the University of Rochester, cost a fraction less than fifty cents; or including the equipment, almost exactly ten cents more. The Elizabeth M. Cudahy Memorial, at Loyola University, cost, including equipment and furnishings, but excluding architect's fees, fifty-five cents.

In the Rochester Library, the cost of equipment, including stacks, book shelving in other rooms, elevator, book conveyor, floor covering,

COSTS

electric fixtures, etc., was approximately 13.7 per cent; and of furniture and furnishings approximately 5 per cent of the whole.

The distribution of costs, in a per cent relation, for the Loyola building, was as follows:

	<i>Per cent</i>
Concrete and masonry	35
Cut stone	12
Carpentry	5.5
Heating (without boilers)	4.5
Plumbing	2.6
Electric wiring	1.7
Lighting fixtures	1.1
Book stacks	12.5
Painting and decorating	4.5
Plastering	1.5
Marble	4.5
Glazing (including leaded glass)	2
Cork tile floors	1.3
Ornamental iron	2
Steel sash	2.5
Screens6
Stone models1
Furnishings	2.5
Hardware6
Metal deck roof	3.5

The costs for the Dartmouth College building were as follows:

	<i>Per cent</i>
General construction work	74.7
Stack construction	5.6
Heating and ventilating	4.6
Plumbing97
Electric work with lighting fixtures	4.21
Elevator and book lift66
Furnishings	9.26

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The figures for the new building at the University of Kentucky are as follows:

	<i>Per cent</i>
General construction work	71.51
Stack construction	9.15
Heating and ventilation	7.75
Plumbing	2.64
Electric work with lighting fixtures	2.88
Elevators and book lifts	1.67
Furnishings	4.40

In no two buildings will these per-cent relations be the same, but these tables give a rough idea of what they are.

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